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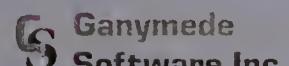
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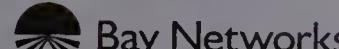
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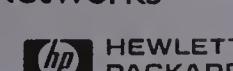
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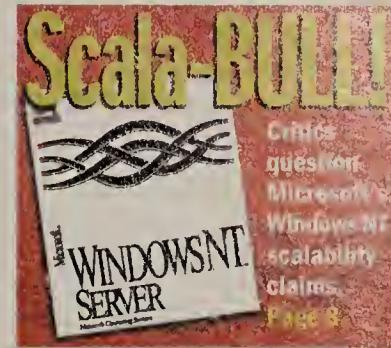
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THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING



Start-up to save users from E-mail avalanches

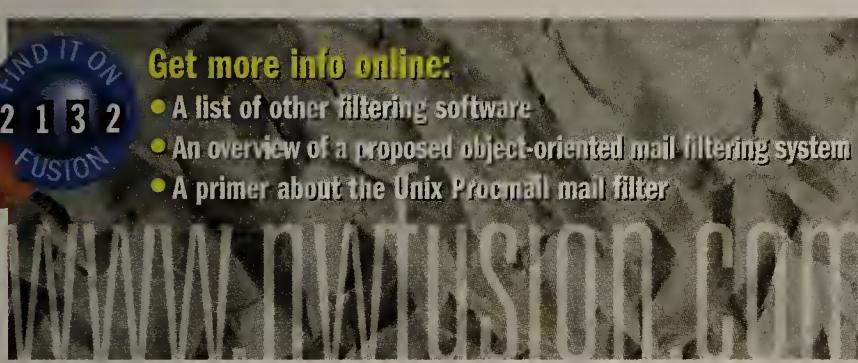
By Chris Nerney
Palo Alto, Calif.

It is an all-too-common scenario: A large, well-known company launches an ambitious Web site, inviting customers to contact them electronically.

And do they ever.

Before company employees know what hit them, they are buried under an endless avalanche of E-mail — purchase orders, questions, comments, complaints and requests for product updates.

See Kana, page 10



Cisco, Bay prep mgmt. tools

By Jim Duffy

Two of the industry's leading internetwork vendors soon will unveil major additions to their network management offerings in an effort to take users beyond simple device management.

Cisco Systems, Inc. this week will unveil an application suite for monitoring service levels across networks based on Cisco routers, as well as LAN and WAN switches. Later this summer, Bay Networks, Inc. will unwrap Optivity 8.0, which will include new diagnostic features to help users more effectively manage Bayswitches, routers and hubs.

The offerings are designed to meet increased customer demand for tools that provide detailed information on service levels delivered by collections of network equipment, as opposed to tools that monitor

individual devices.

Cisco will take its first stab at service-level management with the NetSys Service Management

See Manage, page 10

Prof. cooks up QoS capabilities for Ethernet

By Jodi Cohen

Can an obscure academic from a New York university solve the problem of how to implement quality-of-service (QoS) capabilities in Ethernet environments?

Tzi-cker Chiueh, a professor at the State University of New

See Rether, page 16

NEWSPAPER \$5.00

Cisco cranks up Fast Token Ring

3Com and other vendors also looking to drive token-ring speeds up to 100M bit/sec.

By Jodi Cohen and Jim Duffy

Cisco Systems, Inc. is looking to breathe life into the slumping token-ring market with new technology that brings Fast Ethernet speed to token-ring LANs.

The company plans to enhance its Fast Ethernet Inter-Switch Link (ISL) trunking protocol, making it possible to attach ISL tags to token-ring frames and route the frames across 100M bit/sec Fast Ethernet links. ISL is part of the software that controls Cisco routers and Ethernet switches.

This new "Fast Token Ring" capability — designed for con-



gested server and backbone links — will be available in the second half of the year. It will coincide with Cisco's rollout of its next-generation token-ring switches, said Randall Campbell, a product manager at the company.

Cisco is not the only one getting into the Fast Token Ring act; 3Com Corp. is offering virtual LAN trunking products that enable 100M bit/sec token-ring transfers between its switches.

See Token Ring, page 64

Crunch time for Oracle's NC unit

Network Computer, By John Cox

Inc. has raised expectations regarding thin clients since it was formed a year ago. Can it deliver?

MILESTONES FOR JAVA-BASED NETWORK COMPUTING

May 1996

Oracle's Larry Ellison announces formation of NCI, a subsidiary to promote development of Java-based network computers.

1996



October 1996

Sun announces JavaStation, designed to download and run Java applets from networked servers.

1997

March 1997

NCI announces reference design, with Digital, for the StrongARM microprocessor.

March 1997

NCI and partners IBM, Sun and Netscape announce first smart card specification for NCs.

April 1997

NCI ships first suite of NC software for client NCs and servers. Intel announces support for NC devices. Philips and NEC announce NC device manufacturing partnerships with NCI.

Fall 1997

General, large-scale availability of JavaStations.

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Marc Andreessen
Uber-Webmaster
Netscape Communications



The snag with so many of today's distributed computing environments is the number of problems that seem to get distributed around the environment.

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Is this a great time, or what?



SECURITY SQUABBLE

TimeStep's President and CEO Tim Hember is in the middle of a 'Net security standards skirmish. Page 12.

IP TELEPHONY FOR THE MASSES

VocalTec launches software for holding conferences over IP nets. Page 37.

MICROSOFT'S NEW PUSH

Vice President Brad Chase says the company has a better way to manage push technology. Page 12.

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This Week

Only on Fusion

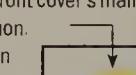
- **Cryptography.** Some of the nation's top cryptography experts last week blasted the government's latest plan for tapping into encrypted data. Read our account, then grab their report. **DocFinder: 2137**
- **Groupware.** IBM is showing off a Java-based whiteboard application. **DocFinder: 2138**
- **Web servers.** Meanwhile, IBM subsidiary Lotus is planning price hikes for its Notes-based Domino Web servers. **DocFinder: 2139**
- **The industry.** Wall Street reacted negatively to news that Netscape and Informix expect higher expenses in coming months. Grab their filings with the government. **DocFinder: 2140**
- **Security.** Investment firm Salomon Brothers will use encryption software from Entrust Technologies to protect the privacy of its E-mail and internal files. **DocFinder: 2141**

From the front page

- **Token ring.** Read our page 1 story about Cisco and other vendors breathing new life into token ring. Then come online for tons of token-ring resources, from a basic primer to a review of token-ring switches. **DocFinder: 2133**
- **Network computers.** When you're done with our front-page look at NCs, link to Fusion for an analysis of the true cost of the devices, along with overviews of the NC strategies of such players as Microsoft and NCD. **DocFinder: 2131**

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News briefs, May 26, 1997

Netscape gets personal

Netscape Communications Corp. and various partners tomorrow will announce an Open Profiling Standard (OPS) for exchanging personal profile information between Internet users and content developers. This profile plan has been under discussion for months (NW, March 3, page 1).

Through the use of the new proposed standard, Web site content developers will get uniform descriptive information (such as name, address, phone number and even hobbies) about the individuals who visit their sites. This will let developers tailor content and services to suit end users' needs and wishes. OPS is being submitted to the World Wide Web Consortium for consideration as an Internet standard.

Separately, Netscape next week will announce an agreement with Information Builders, Inc. (IBI) of New York, to connect Netscape's Internet software with IBI's widely used data gateway product, EDA/SQL.

By integrating the two products, Netscape Web browser and server users would be able to access, through EDA/SQL, an array of Unix and mainframe databases.

The Ax-man cometh to Novell

Novell, Inc. last week acknowledged that it is planning to lay off 15% of its 400-member European workforce as part of a company-wide reorganization spearheaded by new CEO Eric Schmidt.

Additionally, the company this week is expected to announce its intention to lay off another 20% of its employees when it releases 1997 second quarter earnings on Wednesday.

Novell last month issued a statement to investors warning that revenue for the quarter, which ended April 30, would come in between \$300 million and \$335 million, compared to \$375 million the previous quarter.



Can't we all just collaborate?

IBM is looking at marketing a Java applet, called WebCollab, which allows groups to view and manipulate presentations of slides and drawings during teleconferences.

WebCollab, which is in prebeta testing, currently allows up to 10 users to collaborate on whiteboard presentations via any Java-based Web browser. If the product is well received, IBM may develop a more scalable central server version, according to

Suresh Kumar, a research staff member at IBM's System Technology and Science division. The applet can be downloaded for free at www.alphaworks.ibm.com.

3Com's FRAD foray

3Com Corp. last week made its foray into the frame relay access device market when it announced two FRADs for integrating legacy devices into frame relay or X.25 networks.

The OfficeConnect NETBuilder 120 KF offers one Ethernet LAN port, one port for legacy device connectivity and an integrated 56K/64K bit/sec DSU/CSU for frame relay or X.25 connectivity.

The SuperStack II NETBuilder 320 FRAD supports one token-ring LAN port, two ports for SDLC connectivity and one port for frame relay or X.25 links. The OfficeConnect device is priced at \$995 and the SuperStack II FRAD costs \$1,495. Both are available now.



Fixes emerging for DSL choke point

By Tim Greene

Dallas

You are hot to get digital subscriber line service (DSL).

You need an 8M bit/sec feed from the corporate network to your house in a comfortable, new neighborhood, and your boss is willing to pay for it.

But by fitting the power-user profile of a likely DSL customer, you stand a good chance that the phone company will have a hard time providing the service.

That is because the phone lines to your block are most likely supported by multiplexers that simply lack DSL interfaces.

While the digital loop carrier (DLC) multiplexers serve only 20% of phone customers nationwide — about 30 million lines — those customers are the hungriest for bandwidth.

"Rich suburbanites — they are the most likely to foot the bill for DSL, but least likely to get it," said Kieran Taylor, broadband consultant for TeleChoice, Inc., a consultancy in Verona, N.J..

Some of the DLC multiplexers feed into the phone company switching office over bandwidth-rich fiber strands. But some do it over copper trunks designed to support customer lines carrying 64K bit/sec voice channels and simply lack the bandwidth to handle an 8M bit/sec data stream to each line.

One way to get the service to customers supported by DLC muxes is to install separate and

costly parallel fiber-fed networks fed by fiber with hardware designed just for DSL, according to Bill McNamara, director of technical analysis for transport and access at BellSouth Corp.

How fast carriers upgrade to support DSL will depend on how much noise potential customers make, according to Steve Lane, a US WEST product developer. Fortunately, hardware vendors

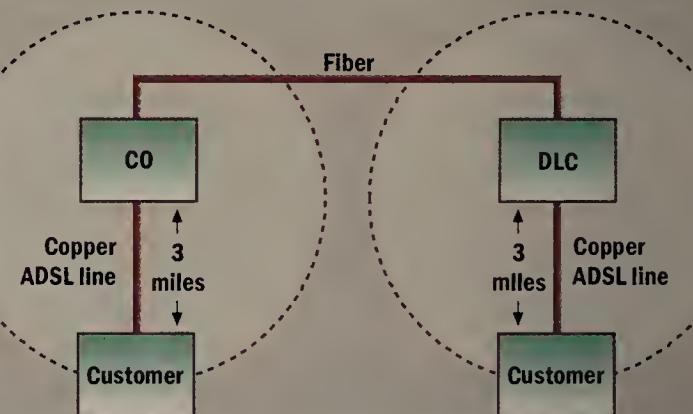
some cards into a Litespan chassis, said Dave Ehretsch, DSC's vice president for Litespan.

The Litespan technology has already been endorsed by Bell Atlantic Corp. Last week, the regional phone company announced plans to test it this fall in preparation for a rollout of DSL service sometime next year.

Ehretsch said the Litespan-2000 also could be used inside

STRETCHING DSL SERVICES' REACH VIA FIBER

Telcos can push DSL services from central offices (CO) beyond the 3-mile reach of copper ADSL lines by using hardware that adapts digital loop carriers (DLC) outfitted with fiber connections to support DSL.



are developing DSL support for muxes already fed by fiber.

DSC Communications Corp. says it is lab-testing hardware that will enable its Litespan-2000 DLC multiplexer to send and receive DSL traffic. Setting up DSL service using existing Litespan-2000 muxes requires minimal new hardware — just drop

a carrier's central office to terminate asymmetric DSL lines rather than just acting as a remote feeder.

Other vendors are working on special boxes to fill that central role, but many do not meet the strict standards telcos demand for central office equipment, Taylor said. ■

AT&T and NYNEX to hook up in New York state

By David Rohde

New York

A team of arbitrators last week sealed perhaps the most anticipated local telephone network agreement since the passage of the Telecommunications Act of 1996: a deal between NYNEX Corp. and AT&T to link their networks in New York state.

But the two carriers immediately clashed over whether completion of the deal means NYNEX is ready to enter the long-distance business.

NYNEX said signing terms to allow AT&T, the nation's largest long-distance carrier, into New York City, the nation's biggest city, demonstrates that NYNEX is ready to seek government permission to enter the long-distance market in the state of New York. Under the telecom act,

regional Bell operating companies may seek approval to enter the long-distance business on a state-by-state basis after demonstrating that they have local competition in those individual states.

According to an AT&T spokeswoman, the arbitrators' ruling settles most operational aspects of interconnection. It does not, however, set final prices for NYNEX to lease AT&T specific pieces of its network, such as central office switching or local loops.

Those prices still must be set by the New York Public Service Commission (PSC) and incorporated into the interconnection pact, she said.

Prices already have been determined for AT&T to enter the New York state local market

via another method — simply reselling NYNEX's local lines.

NYNEX and other RBOCs are pushing to prove that they are ready to seek Federal Communications Commission approval to enter the long-distance business, said Boyd Peterson, an analyst with the Boston-based Yankee Group consulting firm.

"There are a ton of documents ready to be submitted," he said.

Each RBOC has picked one state it will use for its initial FCC filing, Peterson said, "and they've got those filings substantially put together."

Two such filings are currently under FCC consideration — one by SBC Communications, Inc. for Oklahoma and one filed last week by Ameritech Corp. for Michigan. ■

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Windows NT still falls short on scalability, critics say

By Christine Burns

New York

Calling Microsoft Corp.'s Windows NT scalability demonstration an impressive marketing event, industry experts last week

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said they still are not convinced NT is ready to take over for Unix in enterprise application environments.

At the widely publicized Scalability Day held here, Microsoft showed that a single NT Web server could handle a load of 100 million hits per day. The company also displayed a prototype of the Terra Store, a single Digital Equipment Corp. AlphaServer 4100 box running NT and a terabyte-size SQL Server database. In addition, Microsoft Chairman Bill Gates demonstrated a banking application that ran across 25 NT boxes, supported 1.6 billion accounts and handled 10,000 transactions per second at peak load.

Still, experts said Microsoft must do more than throw horsepower at the scalability issues facing customers today.

"What Microsoft really did was shed light on how much work they still have to do to close that gap between NT and high-end Unix," said Neil MacDonald, an analyst with Gartner Group, Inc. in Stamford, Conn. He suggested that NT will not challenge Unix on the high end until NT's transaction processing, clustering and system management capabilities mature.

"Microsoft is trying to redefine scalability as raw perfor-

mance. By saying 'This thing runs so fast,' [Microsoft wants] to convince customers that they don't need real scalability," said Curt Monash, president of

"They showed bare bones technical prowess but left tons of holes throughout the whole manageability and administration spectrum," he said.

Complements to scalable NT

Microsoft's partnership and show wares to help NT grow.

Company	Product	Scalable point
Amdahl	EnVista Frontline application server	Showed Microsoft's CICS and IMS to NT integration software.
Compaq	ProLiant servers	Used in 1 billion transaction-per-day NT demonstrations.
Data General	TeraBack	New, scalable, online backup for terabyte-size SQL Server databases.
Digital	AlphaServer 8200 and 8400	Announced NT availability on these high-end RISC-based machines.
NCR	WorldMark 4300 server	Demonstrated Wolfpack links between its Teradata relational database and SQL Server.
Tandem	Tandem S1000	Demonstrated SAP/3 financial software and SQL Server on single NT machine.
Unisys	Aquanta XR/6 server	Showed 10-way SMP box running NT 4.0 and SQL Server.

Monash Information Services in Lexington, Mass.

Missing from the NT demonstration were details on how Microsoft will make these huge systems manageable and fully operational on a daily basis, said Dwight Davis, editorial director of the "Windows Watcher" newsletter in Redmond, Wash.

Microsoft has said it will provide a single system image for managing up to 16 node NT clusters when it delivers the second phase of its Wolfpack clustering technology next year. However, the company has yet to deliver the first phase of Wolfpack, technology that will enable one server to back up another in case

Water's fine for surfin' overseas

By Denise Pappalardo

So you're in charge of keeping your company's employees connected to the Internet. You have one manager breathing down your neck to keep costs down and another asking how you will support sales staff heading to the Far East this summer.

If you use IBM Global Services or Netcom On-Line Communication Services, Inc. for Internet access you can handle both. IBM and Netcom already support global Internet roaming — and with no long-distance calls, the services can save scads of money. Roaming services from Prodigy Services Co., BBN Planet, MCI Communications Corp. and others are on the way.

IBM has leased lines from service providers around the world to support international Internet access in 52 countries at no additional cost. Netcom uses AimQuest Corp., an international consortium of Internet service providers and telcos.

AimQuest lets Netcom users connect to the Internet through local access numbers around the world.

AimQuest and i-Pass Alliance, Inc. have services that let Internet service providers offer their users an Internet connection through a local access number. Participating ISPs deploy AimQuest or i-Pass hardware and software at points of presence to handle authentication and billing.

If your ISP is not working with AimQuest or i-Pass, do not worry — they may be signing a deal right now.

AimQuest is announcing this week that Prodigy and two of its subsidiaries are joining AimQuest's Global Reach Internet Connection (GRIC) network. AimQuest to date has signed on 87 ISPs and telcos.

Netcom, the largest domestic ISP that AimQuest has signed, announced global roaming service earlier this year. The feature

of failure. Microsoft had originally planned to deliver this capability in January but now is promising to ship it next quarter with a new Enterprise Edition of NT 4.0.

This high-end edition of NT 4.0 was officially announced at Scalability Day. It enables applications to access 50% more memory than NT 4.0 currently allows. It also will include support for six-, eight- and 10-way symmetrical multiprocessing servers. Currently, running NT on more than four processors offers minimal payback.

Microsoft officials said the new edition of NT 4.0 will be powerful enough to run 90% of the business applications available today. This could convince more customers with Unix boxes to switch to computers powered by Intel Corp. processors and running NT, since Wintel systems are less expensive and boast comparable performance, said Mike Nash, director of server marketing at Microsoft.

Industry analysts, such as Jon Olsik of Forrester Research, Inc. in Cambridge, Mass., disagreed. Olsik believes customers have identified a place where NT lives and a place where Unix lives in their environments. "There is no confusion here — the borders are very well defined, and no one is holding his breath waiting for NT to scale," he said. ■

pricing varies, it is difficult to say how much end users can save, but analysts agree it could be substantial.

It can easily cost \$20 per hour to make an international call from Australia, which is what users would do if they were trying to access their U.S.-based ISP from Down Under.

For ISPs that work with one of the consortiums that charge their users anywhere from \$1.50 to \$14 per hour for global roaming, this can be a huge cost savings, said Rebecca Wetzel, director of Internet services at TeleChoice, a Verona, N.J.-based consulting firm.

Users seem to like the idea. Dolby Laboratories, Inc. in San Francisco, is trying global roaming service offered by Silicon Connections LLC, of Moraga, Calif. Bill Jasper, president of Dolby, has been using the service in Germany, Italy and the U.K. over the last two weeks.

"It's an excellent way to access the Internet and it looks like we will roll it out to our other travelers," he said. ■

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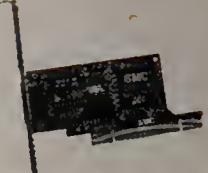
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Manage

Continued from page 1

Cisco. Service-level management establishes and monitors trans-

A NEW WAY TO MANAGE

Cisco's NetSys Service Management Suite:

- Provides end-to-end service-level management of Cisco internetworks.
- Manages Cisco LAN and WAN switches as well as routers.
- Includes policies for establishing service priority.
- Supports links to Cisco security servers and firewalls.
- Will manage Tag Switching services and RSVP QoS requests.

Bay's Optivity 8.0:

- Features more detailed LAN and ATM switch statistics.
- Merges Optivity LAN and Internetwork applications into one offering.
- Runs on HP OpenView 5.0 under HP-UX 10.20.

mission priorities and bandwidth allocation for particular users and applications.

The NetSys Service Management Suite, which runs on Unix workstations, builds on Cisco's NetSys Enterprise/Solver suite of applications for managing router connectivity, baselining and performance monitoring. The NetSys Service Management Suite now manages Cisco's LAN and WAN switches, and routers.

The software will let users detect and resolve critical network service problems and verify proposed network configurations to assess their impact on network service levels.

Eventually, the NetSys Service Management Suite will manage Cisco's Tag Switching services and Resource Reserva-

tion Protocol requests for quality-of-service guarantees, sources said.

The NetSys Service Management Suite will also allow administrators to establish policies for delivering and guaranteeing service levels, sources said.

For instance, administrators could write a policy that gives the company CEO priority over assistant vice presidents in transmitting data over an ATM link.

The NetSys Service Management Suite will include links to Cisco's security and firewall products in order to enforce these policies, sources said.

"They've got some interesting wrinkles," said one source who requested anonymity.

Information on the pricing and availability of the NetSys Ser-

vice Management Suite was unavailable at press time.

Cisco declined to comment on the announcement.

Bay upgrades Optivity

Cisco rival Bay will add at least two features to Optivity 8.0. The first is more detailed switch diagnostics, sources said.

"They're going to have more ATM stats, more LAN stats. It's going to be a graphical tool to configure the Centillion 100s and stuff like that," said an Optivity user familiar with 8.0.

Second, Bay will merge existing Optivity LAN and Optivity Internetwork applications into one package under Optivity 8.0. This will give users a single application for managing hubs, routers and switches.

Optivity LAN is a hub and

LAN switch management application, while Optivity Internetwork manages routers.

Sources also expect Optivity 8.0 to provide enhanced Centillion switch management.

Optivity 8.0, which runs on Unix-based management platforms, will also support Hewlett-Packard Co.'s new OpenView Network Node Manager 5.0 and run under the HP-UX 10.20 operating system, sources said.

Pricing for Optivity 8.0 was unavailable at press time. Bay confirmed that it will be released later this year.

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HP adds Web, Windows NT support to systems management package

Hewlett-Packard Co. this summer will release a new version of its flagship systems management offering.

HP confirmed that it will unveil IT/Operations (IT/O) 4.0, which will enable administrators to monitor system performance and availability via a Web interface as well as track systems running Windows NT.

In addition, HP will add some of its Event Correlation Services (ECS) and OpenView Network Node Manager (NNM) 5.0 technology into IT/O 4.0.

IT/O 4.0 will be a key piece of HP's recently announced Service Management initiative. The new software will allow users to monitor uptime on a wider range of server platforms and help locate the root of network problems faster, sources said (NW, March 31, page 8).

The Web interface for IT/O 4.0 will allow users to access event and performance information and system and device status, locally or remotely, from any PC or workstation. Until now, IT/O events could only be accessed and viewed from an HP-UX workstation running IT/O management console software.

New Windows NT support will allow administrators to monitor availability of Windows NT clients and servers, extending IT/O's management oversight beyond Unix-based platforms.

Integration of IT/O with ECS will allow companies to perform real-time, high-speed event correlation from an IT/O 4.0 graphical user interface (GUI). Users will be able to identify the root of a problem faster because ECS filters out insignificant events, according to HP.

But sources say IT/O 4.0 will not include a full-blown version of ECS.

"What's going to ship is the [ECS] engine along with some preset circuits," one source said. "If you want to do your own [configuration], you have to then go out and buy the GUI part of [ECS]."

Inclusion of NNM 5.0 will allow users to discover IPX and HTTP devices, as well as locate devices by media access control address. This is in addition to the IP discovery NNM and IT/O already perform.

IT/O 4.0 will ship in the third quarter. It will cost about \$40,000.

—Jim Duffy

Kana

Continued from page 1

The resulting backup leaves businesses with unattractive alternatives, including adding more workers to the payroll, using depersonalized automated response programs or — perhaps worst of all — simply ignoring vast quantities of E-mail.

Now Kana.Com, a 9-month-old start-up, is developing software designed to help companies mine their mountains of E-mail to extract revenue and valuable information.

The software will allow a worker to quickly scan an E-mail message in an inbox, assign it to various categories based on its content and, with a click of the mouse, create a response automatically personalized to the recipient.

In cases in which a customer sends an E-mail seeking disparate information, such as the availability of a certain catalog, the price of a specific product and details about job opportunities, a response would be sent that answers all three queries, said Mark Gainey, Kana.Com CEO.

With another click, the response also would be sent to other interested parties, such as retailers located near the consumer or company sales representatives, he said.

The message and response would be stored in a database for any future customer dialogue.

In the beginning...

Kana.Com was founded last August by Gainey, who said the potential loss of revenue because of poor E-mail processing is something few businesses can afford.

"Consumer E-mail is extremely valuable," he said. "But very few companies manage the process well."

Gainey — who named the company after his dog, Kana (see

FACTS ABOUT KANA.COM

Founded: August 1996 by Mark Gainey
Based: Palo Alto, Calif.
Funding: \$700,000 investment led by Draper Fisher Jurvetson
Employees: 10 (and hiring)
Product: E-mail response software

Fun Facts

Kana.Com was named after founder Mark Gainey's dog, Kana. Gainey rescued the 3.5-year-old shepherd-husky mix from the Santa Clara, California, pound. Kana is a female and can be reached at kana@kana.com.



graphic) — said the start-up's products will go beyond agent technology. Agents can produce computer-generated replies to E-mail, but not always with great precision.

"This is not auto-response," he said. "This is response technology that does not sacrifice recipient satisfaction."

Paul Hoffman, director of the Internet Mail Consortium, said while software such as Endora 3.0 "already has filtering that allows you to create an automated response, it sounds like

this one will let you do even more.

"There's definitely a valid market for this," he said. "A help desk type of thing with E-mail is pretty valuable."

Kana.Com's software also will be able to analyze volume and content of incoming mail as well as outbound response rate, according to Gainey.

This real-time information can be used by marketing, sales, support, system engineering and research departments, he said.

"Rather than being a nuisance, E-mail is a powerful link to consumers and can be used as an effective sales and marketing tool," Gainey said.

A prototype of the as-yet-unnamed product is undergoing evaluation by Pacific Bell's Internet Services Division. Gainey said he plans to do further beta testing this summer and is planning a commercial release of the product early in the fourth quarter.

While declining to discuss in detail how the product works, Gainey said it can run on multiple platforms, uses scalable architecture in a client/server model and is database-driven. Pricing has not been determined, he said.

Gainey is a 1990 Harvard University graduate and was employed for more than four years by a Boston-based venture capital firm before he "got the entrepreneurial bug."

Kana.Com recently was given \$700,000 in seed funding.

Lead investor Draper Fisher Jurvetson of Redwood City, Calif., contributed about \$500,000. ■



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Nortel, Lucent spruce up voice messaging

By David Rohde

The two top voice switching gear companies are taking steps to encourage customers to transmit store-and-forward voice messages over corporate WANs and the Internet.

Northern Telecom, Inc. last week became the first vendor to announce availability of a product using the new Voice Profile for Internet Mail (VPIM) protocol. Separately, rival Lucent Technologies, Inc. issued a money-back guarantee for its Intuity Interchange server, which enables end users at different sites on a corporate data network to swap voice messages without racking up carrier tolls.

Both vendors are trying to get users to consider store-and-forward voice messaging as an alternative to E-mail.

The companies draw a distinction between voice messaging, where users preplan their messages for delivery to recipients, and the more spontaneous average voice mail.

Nortel's offering, Meridian Mail Net Gateway, consists of a Dialogic Corp. voice board and

software that the customer installs on a Windows NT server. Attached to Nortel's Meridian Mail PBX adjunct via an ordinary analog telephone line, the gateway converts voice messages into Multi-purpose Internet Mail Extensions attachments and routes them via the Simple Mail Transfer Protocol. This technique forms the heart of the emerging VPIM standard.

Darrel Jennings, Nortel's assistant vice president for Meridian Messaging, noted that early Net Gateway users will have to load IP addresses of all prospective recipients into an internal directory on the gateway. When the VPIM standard matures, Jennings expects it to enable public directory lookups of IP addresses.

Available in July, each Net Gateway kit will cost \$3,000.

Meanwhile, Lucent announced its Intuity NetMessaging Solution, which is built around the company's Intuity unified messaging server. The LAN-attached Intuity server, an outgrowth of Lucent's Audix voice mail system, encapsulates

voice messages in bit streams and ships them over the WAN. If the WAN is star-configured, the messaging net is anchored by Lucent's Intuity Interchange hub.

The offering guarantees that users will save money by eliminating carrier tolls if they install the Intuity Interchange system, often a six-figure investment, and accept Lucent training on when to use voice messaging vs. E-mail.

Lucent wants new customers to replicate the experience of customers such as Tektronix, Inc., which installed Intuity at nine locations linked via a frame relay net.

Close to 10% of Tektronix's 20,000 to 30,000 daily voice messages go over the company's frame relay network, said Cliff Roper, Tektronix's voice and video manager. Sales managers like to use Intuity instead of E-mail because salespeople on the road typically have easier access to phones than computing devices, Roper said.

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Microsoft pushes CDF as better way to manage Webcasting

By Carol Sliwa

San Francisco

The push technology wars rage on.

Microsoft Corp. last week made a case that its method of automatically delivering information to the desktop is better than Netscape's because it is more manageable.

Microsoft's managed Webcasting is made possible by the Channel Definition Format (CDF). Content providers create CDF files that allow users to indicate the content they want and the schedule for updating it.

The company compared managed Webcasting to ordering only the food desired from a menu, rather than having everything on that menu delivered and then having to hunt through it for what you want.

With an administration kit, network managers can further control Webcasting, said Brad Chase, a Microsoft vice president.

Microsoft Corp. dismissed Microsoft's new push marketing plan.

"Everything Microsoft is talking about with CDF can absolutely be done [by content providers] now using standard HTML content and HTTP tags,"



We give [end users] the capabilities to get the content they want more easily, in a more personalized and compelling way.

Brad Chase, vice president, Application and Internet Client group, Microsoft

said Mike McCue, Netscape's director of advanced technology.

"You can define what that content is about, you can apply meta data to it, you can choose how often you want it to be updated. And you can choose what files make up a specific channel," said McCue.

McCue charged that Microsoft is merely "trying to take over the standards process."

Both Netscape and Microsoft

have been rallying content providers around their push models.

Microsoft last week announced that Dow Jones, Dun & Bradstreet, Ernst & Young, and *Forbes* magazine are among the content providers that have pledged to develop channels for its Internet Explorer 4.0 Web browser.

Just before Microsoft's press event, Netscape made a pre-emptive strike.

It announced that Marimba, Inc.'s channel partners, which number more than 100, will be featured in the new Netcaster push component of Netscape's Communicator client.

But one partnership area where Microsoft currently has an edge over Netscape is multicasting, or "true" push, as Microsoft likes to call it.

Tibco Software, Inc. last week announced it would support the Microsoft Explorer 4.0 browser and CDF to enable automatic broadcast of content the instant the new information becomes available, transmitting the data from one source to many.

Netscape is working on a strategy for multicast, McCue said. ■

Security spec splinters

Dispute over key management could result in interoperability problems for electronic trading partners.

By Ellen Messmer

An IETF standard for encrypting data between trading partners is almost complete, but an industry dispute over an element of the standard called key management means that many standards-based products may not be interoperable.

For two years, the IETF Security Group has labored to hammer out the IP Security (IPSec) protocol, a standard way that businesses can open up an encrypted link to a trading partner's network. The link is encrypted after authentication by means of an X.509 digital certificate at an IPSec-based firewall or gateway.

But an unresolved, bitter dispute over the technique for automatically swapping keys over the 'Net — referred to as key management — has resulted in two incompatible schemes in the IPSec specification. The specification is expected to be completed this summer and officially adopted as an IETF standard by early next year.

In this battle of the acronyms, the debate centers on the Simple Key Management for IP (SKIP), developed by Sun Microsystems, Inc., and the Internet Secure Association Key Management Protocol (ISAKMP), developed by the National Security Agency.

The latest version of ISAKMP, called ISAKMP/Oakley (after cowgirl Annie Oakley), was developed by former University of Phoenix Professor Hilarie Orman, who is now at the Defense Advanced Research Projects Agency.

While the experts gladly argue the relative merits in detail, the two have some obvious differences. Sun's SKIP, ready now, is a sessionless protocol for exchanging keys. ISAKMP, now in its seventh revision, depends on two-way stateful communications.

At this point, ISAKMP is required for the next-generation IP — IPv6 — with SKIP as an option. However, for IPv4, on which today's Internet is based, IPSec lets either ISAKMP or SKIP be used, though that, too, is still being argued.

"SKIP is not part of the stan-

dard," said Tim Hember, president and CEO of TimeStep Corp., which plans to ship an ISAKMP gateway this fall.

"Yes, it is," countered Rick Kagan, vice president of marketing at VPNet Technologies, Inc., a start-up with a SKIP-based firewall it sells as IPSec compliant. He noted that there have been so many versions of ISAKMP, it is unclear whether any products based on the protocol currently work together.

A gateway encryption product from start-up Red Creek Communications, Inc., is supposed to support IPSec with ISAKMP, but it is not known to interoperate with anything else at this point, acknowledged Bill Wiedemann, Red Creek president.

In Sun's camp, Check Point Software Technologies, Ltd., Toshiba Corp., Proteon, Inc., OpenRoute, Inc. and SunSoft, Inc. already have firewalls or products, such as client software, supporting SKIP.

"We say we're IPSec-compliant when asked," said Smita Deshpande, director of marketing for network security products at SunSoft's electronic commerce group.

SunSoft includes SKIP in its SunScreen firewall. The company plans to add SKIP to Solaris 2.6 in August and to the Java OS around the same time. Last week, SunSoft announced that a Moscow-based firm, ELVIS+Co., will supply SunScreen SKIP IP, SKIP-based client software with Data Encryption Standard and Triple-DES encryption for Windows 3.11, 95 and NT.

A large constituency of users driving adoption of ISAKMP/Oakley is the U.S. automotive industry. Bob Moskowitz, Chrysler Corp. technical support specialist, has been pushing a dozen vendors, including Cisco Systems, Inc. and Microsoft Corp. to test interoperability in their products.

"ISAKMP at works at the host level, but eventually we'll get it to the application level," Moskowitz said. "SKIP is adequate for an intraenterprise, single-trust environment. However, in an interenterprise, multitrust arena, it breaks down." ■

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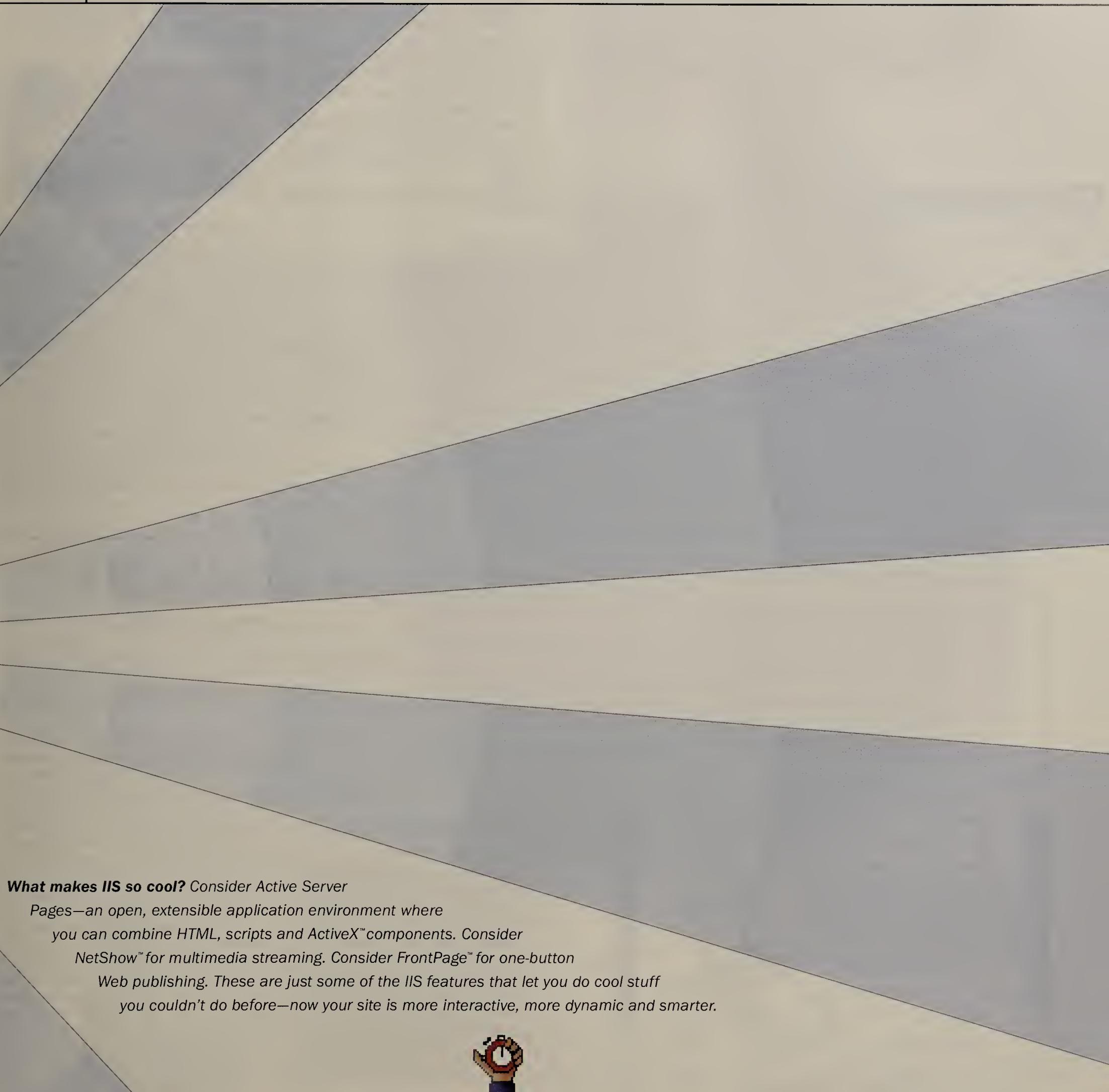
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Rether

Continued from page 1

York at Stony Brook has developed an IP-based protocol — dubbed Real-Time Ethernet (Rether) — that provides bandwidth guarantees to multimedia applications running over Ethernet and Fast Ethernet networks.

Rether works in tandem with the Resource Reservation Protocol (RSVP). RSVP enables applications to request a

Rether basics

1 How does Real-Time Ethernet (Rether) work?

It is based on a token-passing scheme that regulates access to the network by passing a control token among the nodes on an Ethernet segment.

2 Is it a standard?

The State University of New York at Stony Brook is in the process of submitting the Rether protocol to the IETF for standardization.

3 How does Rether differ from Resource Reservation Protocol (RSVP)?

Rether works in tandem with RSVP. RSVP enables applications to request a specific quality-of-service level and Rether responds to those requests.

specific QoS level and Rether responds to those requests.

"It's pretty clear to everybody that the big hole in RSVP is that it only lets you ask for a reservation and has no way of honoring it," said Thomas Nolle, president of CIMI Corp., a consultancy located in Voorhees, N.J. "Something like [Rether] could definitely solve the problem of how to guarantee the resources that RSVP allocates."

Chiueh is in the process of submitting the Rether protocol to the Internet Engineering Task Force for standardization, and he is talking with Ethernet switch maker Matrox Electronic Systems, Ltd. about licensing the technology. But he has a long way to go before Rether gains industry acceptance, industry observers said.

"Rether clearly targets the need for a cohesive, standardized, end-to-end QoS mechanism in the frame world," said John Morency, principal at The Registry, Inc., a Newton, Mass.-based consultancy. "But the history for these types of academic initiatives hasn't been good, with such unsuccessful technologies like Cornell's Cells in Frames [CIF]."

CIF was designed to allow customers to run ATM multimedia applications over Ethernet, but it never took off.

Another challenge will be trying to garner support from leading switch vendors, one user said.

"Rether sounds interesting because it is very important to me that Ethernet has QoS capabilities for handling multimedia applications," said Frank Trombley, manager of systems architecture at Hopkins & Suite, a law firm in Chicago.

"But it needs the backing of key industry vendors like 3Com, Cisco and Intel. Otherwise, it just isn't going to happen," he said.

So far, none of these heavyweights has signed on.

How it works

Rether is based on a token-passing scheme that regulates access to the network by passing a control token among the nodes on an Ethernet segment.

This token-passing mechanism, however, should not be confused with good old token-ring technology, Nolle said. Rether's scheme is really a primitive form of available bit rate, which allows connections to expand and contract as application needs and network capabilities dictate, he explained.

With this scheme, vendors would be able to upgrade switches and routers to support Rether via software and avoid costly hardware changes, Chiueh said.

And that is important to Trombley. "Not requiring a hardware changeout is attractive because that can be expensive, and law firms want to keep their costs down," he said.



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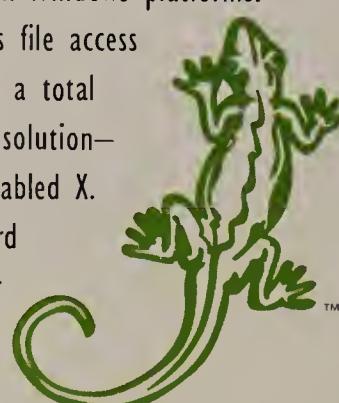
Trombley also pointed out that he expects to be able to use Fast Ethernet to run videoconferencing applications for client and attorney meetings, eliminating the need for ATM in the LAN.

Chiueh, who already has Rether up and running at the university, agreed. "The only thing that ATM has going for it right now is QoS," he said. "Now Rether can prove that Ethernet can also have QoS without changing anything hardware-wise."

Nolle agreed that Rether could be good for the industry, but said, "I don't think we should assume that what is proposed in these early rounds is necessarily what is going to get accepted and implemented." ■

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Reliability bar raised by ISPs

By Denise Pappalardo

Reston, Va.

Nine of the largest Internet service providers last week formed IOPS.ORG, a group that plans to make the Internet more reliable by examining network performance and operational practices.

Charter members of the group are ANS Communications, AT&T, BBN Corp., EarthLink Network, Inc., GTE Corp., MCI Communications Corp.,

IOPS.ORG'S MISSION

The group's goals for this year:

- Implement ways to resolve operational and reliability problems, first by addressing electronic exchanges and trouble-ticket tracking.
- Choose a central point of contact at IOPS.ORG for service providers and vendors that are not part of the group.
- Work with other industry organizations such as the Computer Emergency Response Team on Internet engineering issues.
- Identify with equipment vendors needed product improvements that will enhance the Internet's operation.

Netcom On-Line Communication Services, Inc., PSINet, Inc., and UUNET Technologies, Inc. Other ISPs will be invited to join. First-year goals include working toward solid network reliability and collaborating with existing technical industry groups (see graphic).

One focus of IOPS.ORG will be to prevent and resolve network integrity prob-

lems, said Ira Richer, interim executive director of IOPS.ORG. "Today, if a problem occurs, it's possible that it could spread from one ISP to another," Richer said. "If there was a routing problem, it takes cooperation to make it not propagate."

The group is not going to be in the standards business, said Erik Grimmelmann, network and access vice president at AT&T's WorldNet Internet service. Instead, IOPS.ORG will share technical information that will make the Internet a more uniform, solid network, he said. It takes much work and coordination to make technology work seamlessly, and this is what IOPS.ORG will address, Grimmelmann added.

Grimmelmann said the IOPS.ORG will follow a path like the one taken by the Network Reliability Steering Committee (NRSC), a group of telecommunications service providers and equipment manufacturers that address public switched telephone network reliability and quality issues. The NRSC is part of the Alliance for Telecommunications Industry Solutions, a technical carrier industry association in Washington, D.C.

IOPS.ORG plans to hold meetings twice a year in addition to teleconferences. The group is run by the Corporation for National Research Initiatives, a nonprofit organization in Reston, Va.

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The IDG News Service contributed to this story.

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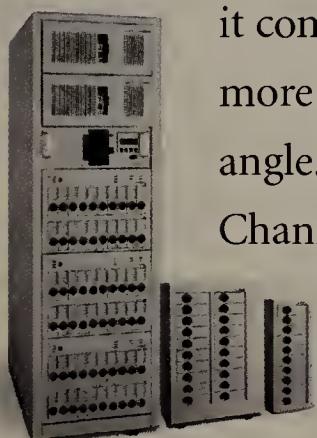
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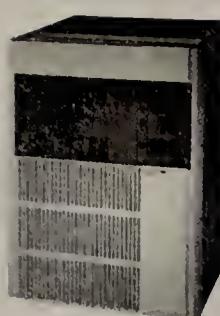
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Briefs

■ **Intel Corp.** last week extended its **server management software** to provide remote control capabilities even when a server has crashed. *LANDesk Server Manager Pro*



2.8, an integrated hardware and software package, allows management of servers running Windows NT or NetWare. The product costs \$1,495 and will ship in June.

© Intel: (408) 765-8080

■ **Vinca Corp.** today will announce enhanced **clustering software** for tying two Windows NT servers together and ensuring users uninterrupted access to applications running on either machine in the event of a server failure. *Co-Standby-Server for NT* features a low-level mirroring engine that allows both servers in a clustered pair to be fully functional, each with its own set of users and applications.

Previously, Vinca's *Standby-Server for NT* required that the second server remain idle to accommodate a failure in the first. *Co-StandbyServer* also has a remote management capability that lets an administrator use a Web browser to configure, monitor and manage clustered servers.

Vinca officials said the new software accomplishes much of what Microsoft Corp.'s own clustering software — code-named *Wolfpack* — will do when it ships later this year.

Vinca also plans to provide an upgrade path from its product to *Wolfpack* and then offer its cluster management software as an add-on to *Wolfpack*. *Co-StandbyServer* will ship in July and cost \$3,999.

© Vinca: (800) 934-9530

Novell's new leader gets ready to deliver

CEO Schmidt says native IP and directory services are key.



Eric Schmidt says he left the best job in the world at Sun Microsystems, Inc. to become Novell, Inc.'s CEO earlier this year. He may now have the most challenging job in the network industry. Schmidt spoke recently about the challenges of competing against Microsoft, delivering native IP technology and more with *Network World* Editor in Chief John Gallant and Senior Writer Carol Sliwa.



How important is it to the network industry that Novell succeeds?

Customers really want Novell to be successful, and they're not saying that because they like me. They're saying that because they want choices beyond Microsoft. They want interoperability.

And so the question is: How long will it take for Novell to deliver a pure Internet solution? What I have said publicly is, judge me in a year.

In a year, we'll have shipped an entire new set of products. Everything gets refreshed within the next year, if not within the next month to six months. So we'll really know whether we've made the transition or not.

Out of all of the things you need to deliver on, what are the most important?

The No. 1 strategy is [Novell Directory Services]; the No. 1 tactic is native IP.

Regarding the concept of network services, does the market understand the concept well enough to buy in to it?

It's hard. If I did products that were clones of Microsoft's, I would fail. If your product strategy has to be defined by doing something that Microsoft is doing, then that's a bad strategy. You have to come up with products that are such no-brainers that customers buy them because they solve some important need.

We believe we've identified that in the security and directory area.

How much of a window of opportunity do you figure you have in the services market before Microsoft releases products that may not be as good, but are good enough to keep people from buying yours?

My general theory about Microsoft is the waterfall theory — everything ends up at Redmond. Innovation occurs elsewhere, is popularized elsewhere and eventually gets copied by Microsoft.

It's a waterfall. The thing we have to do is stay some number of years ahead, and you could say the same thing about companies like Netscape and Sun that compete with Microsoft.

We need to offer products that are differentially better than NT.

We think the single logins, single point of presence, ubiquitous service model are such examples.

What's your public stance on Microsoft?

Microsoft is a competitor and a partner. Microsoft is a competitor in the platform business. Microsoft is an important platform partner in the services business. I believe Microsoft will say the same thing, in reverse.

So in that competitive piece of the market, what will be your public stance about NT? Is

Novell going to be outspoken about NT's limitations?

NT needs help. We provide that help. Is that bashing? NT needs help because the directory [is weak].

What's the most frequent question you get from customers?

When is native IP coming? They say they have a big investment in Novell products but for various reasons they want to use IP.

Our strategy is to be transport-independent, and I hope a year from now this notion of having a transport bias is a memory. But today, there is something of a platform bias in favor of IPX. The current IP offerings are add-ons.

There are services in IPX that do not have exact analogs in the IP world — for example, [Server Advertisement Protocol]. There are new protocols in the Internet world that we need to address. It's not trivial.

Have you committed to a timetable for the IP technology?

We've said that we'll have a new release, internally called Moab.

I've done an initial review of it, and it looks pretty good. What we said is that it'll be out at the end of the calendar year, plus or minus.

There's more online:

- **The complete transcript of our interview with Eric Schmidt**
- **Novell financial and stock news**
- **Recent IntranetWare news**



www.nwfusion.com

It's fascinating to watch a company turn itself around after having its image tarnished. Is there a company that you would look to as a role model in the high-tech industry as you undergo this task?

Sure. Lots. 3Com [Corp.] is one with [CEO] Eric Benhamou. 3Com is almost a perfect analogy. It had been losing market share to Novell because 3Com had partnered with the wrong company — in this case, Microsoft.

SPOTLIGHT NOVELL

Eric went in and refocused the company on a relatively straightforward value proposition.

Another example would be [Computer Associates International, Inc.] in 1991.

The company did a series of acquisitions that didn't work. Things got trashed. It took them a couple of years to refocus the company.

A third example would be Oracle in '92, when they got ahead of themselves on customer revenue behavior in the channel.

They hired Ray Lane, who is extraordinary. He came in, took a company that was largely dysfunctional, put traditional management in it, got the products revitalized and doubled or tripled the business in a vertical space.

The common element in all of these being...?

Focus.

What are the three key misperceptions about Novell?

One is the Microsoft is eating your lunch scenario. But our installed base is actually strong. Units are good.

The second misperception, which I, to some degree, have even accentuated with my own comments, is that somehow Novell is not an IP player.

You can build an IP-centric network today using Novell products, but you need to use some add-on products. That's being fixed.

The third thing comes back to what does the company stand for?

The company has been trying to articulate a message for some time but apparently not very well. So I'm trying as hard as I can to articulate it clearly and then get the company to deliver. It's more than just me. ■

Nextweek: We talk to Novell's Senior Executive Vice President for Internet Products Denice Gibson.

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RADIUS on the radar screen

The list of companies supporting the Remote Access Dial-In User Service (RADIUS) remote access standard reads like a who's who of the network industry. On the list are 3Com Corp., Bay Networks, Inc., Cisco Systems, Inc., Novell, Inc. and Shiva Corp., to name a few.

Microsoft Corp. is conspicuous by its absence. But Funk Software, Inc. has come to the rescue with a product that brings RADIUS support to Windows NT networks. Let me explain.

Funk Software recently introduced a product, called Steel-Belted Radius, that supports the IETF RADIUS standard and is based on the suddenly ubiquitous RADIUS technology developed by Livingston Enterprises.

Livingston was founded in 1986 to provide management systems for the technology and communications industries. What the company quickly learned, however, was that remote access to information was needed more than information management.

The company's first product, the PortMaster Communications Server, was released in 1990 as a low-cost system for providing serial port TCP/IP access to Unix networks. This was quickly followed by an IPX-based offering and a combination access server/router.

There were many authentication schemes available for remote access then, and each operating system vendor seemed to have chosen a different one. So in 1992, Livingston created RADIUS, distributed binary code for all the major Unix operating systems and released the source code to others, as well.

RADIUS server software includes three parts: an authentication server, client protocols and an accounting server. These pieces can all run on one machine or on separate ones outfitted with different operating systems. It works by having a user dial in to a remote access server and pass logon name and password information to it. The information is forwarded to a RADIUS authentication server that validates the user and returns the information necessary for the access server to initiate a session with the user.

Why the indirect method? Normally, an access server is network operating system-specific. I can't use Novell's NetWare Connect to authenticate to a Windows NT server, nor will NT's remote access server allow an IPX client to authenticate to a NetWare server. With RADIUS, though, either client can dial in, be authenticated to the proper network operating system and connect to the right domain or server.

Today, most major suppliers of remote access products, routers, firewalls and

other communications products are adapting their products to RADIUS.

And that's where Funk Software comes

in. Its Steel-Belted Radius is the only product available that supports NetWare and NT networks.

For more information on Funk, visit www.funk.com/product.html.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at wired@vquill.com.

Tip of the week

If you need to provide virus protection, encryption, ActiveX/Java protection and Web server IP filtering to your Windows 95 clients, one company claims it can do it all. Check out EMD Enterprises' EMD Armor 97 demonstration at www.emdent.com.

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Photo:



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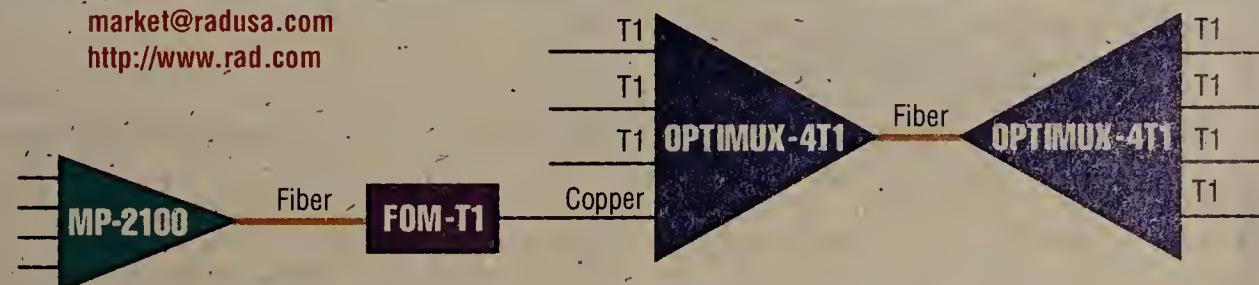
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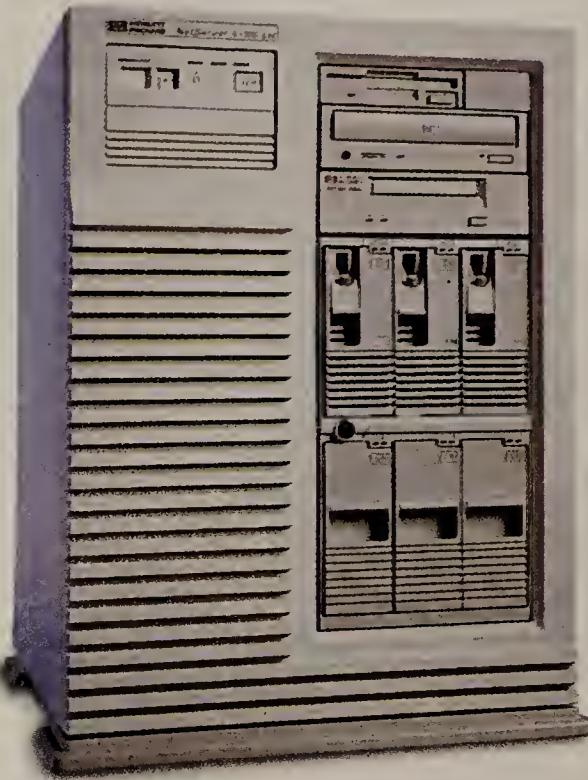
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Briefs

Cisco Systems, Inc. and Interlink Computer Sciences, Inc. announced the availability of **Cisco IOS for S/390**, which enables access to data and applications on mainframe computers via TCP/IP networks.

Cisco IOS for S/390 is available now starting at \$32,000.

© Cisco: (408) 526-4000; Interlink: (510) 657-9800

Computer Associates International, Inc. (CA) last week said it will offer users of **Digital Equipment Corp.** management software a free upgrade to its **Unicenter TNG** product.

The offer follows completion of CA's integration work, melding Digital's Polycenter management products with Unicenter TNG. CA acquired several Polycenter product lines from Digital last year.

© CA: (516) 342-5224

Texas Instruments, Inc. (TI) is selling its **Multipoint Systems** business unit to **Bosch Telecom, Inc.**, a subsidiary of the **Robert Bosch GmbH**, in Stuttgart, Germany. TI's Multipoint Systems business unit focuses on **Local Multipoint Distribution Service** products that support wireless LAN and WAN connectivity. The companies did not reveal the value of the deal.

Bosch, in Gaithersburg, Md., will use the acquisition to develop its business relationships in North America.

© Bosch: (301) 670-9777

Efficient Networks, Inc. is entering the digital subscriber line (DSL) market. Known for making ATM network interface cards, Efficient plans to focus on **making customer premises equipment**, initially in cooperation with **ADK Telecommunications**. Because customer premises asymmetric DSL modems must communicate with modems in service provider central offices, Efficient will have to work with manufacturers to ensure interoperability.

© Efficient: (972) 991-3884

Label switching group has work cut out for it

By Jim Duffy

Memphis, Tenn.

Despite drafting a "milestone" document, the tough work lies ahead for the Internet Engineering Task Force's Multi-protocol Label Switching (MPLS) working group.

The MPLS group is attempting to define a standard method for switching Layer 3 packets, which will improve performance and scalability among multivendor switches and routers. The group, which was chartered in February, recently drafted a framework document providing an overview of MPLS and some MPLS proposals (NW, April 28, page 6).

The framework document is considered a milestone by Cisco Systems, Inc., a participant in the MPLS group. But the group has several technical hurdles to over-

come before an MPLS specification — expected in 1998 — emerges, minutes from a recent meeting here indicate.

For instance, the technical approaches section of the framework document — which will outline MPLS label distribution, virtual circuit stream merging, loop handling, interoperation with the Next Hop Resolution Protocol (NHRP) and hierarchical network operation — is largely incomplete.

"There [is] still lots of work to be put into this section," the meeting minutes state. "We need to put more effort into [it]."

More effort also needs to be put into resolving the differences between Cisco's Tag Switching approach to MPLS and IBM's Aggregate Route-based IP Switching (ARIS) tech-

nique, the minutes state. Tag Switching and ARIS differ in the way they assign labels to establish switched paths through the network.

Tag Switching uses TCP, while ARIS uses a datagram protocol, the minutes state.

"Anytime you have fairly fully cooked proposals on the table at the get-go, there's going to be some disagreements and beauty contests," said George Swallow, a software engineer at Cisco and co-chair of the Memphis MPLS meeting.

"And there's some vested interests because both of the major players are already cranking code," he added.

An area of "major controversy" among MPLS vendors, according to Swallow, is loop prevention. Decreasing the time-

See MPLS, page 24

THE ROAD TO A STANDARD

Issues to be resolved by the Multi-protocol Label Switching (MPLS) working group:

► How MPLS switches and routers handle:

Label distribution
Virtual circuit stream merge
Time-to-live decrement
Loops
Interoperation with NHRP
Network hierarchies

► The need for a more detailed comparison of Tag Switching and ARIS

► Use of label switching with ATM

► Inclusion and interworking of flow-, topology- and reservation-driven approaches

► Interoperation of MPLS with RSVP

► Establishment and application of QoS to label-switched path

Ascend introduces management for its remote access gear

By Tim Greene

Alameda, Calif.

Ascend Communications, Inc. enjoys great success selling remote access devices from dial-up gear to high-speed routers, but until now it lacked a sophisticated way to let customers manage them.

NetClarity, Ascend's new SNMP-based management software, will change that by collecting real-time performance data about Ascend and other communications gear in the network.

NetClarity includes a central management application that can work with Hewlett-Packard Co.'s OpenView or operate as a stand-alone package on Sun Microsystems, Inc.'s Solaris 2.5

or Microsoft Corp.'s Windows NT servers. NetClarity agents reside in Ascend devices and report a variety of management information such as status and configuration data to the central application.

Once in place, NetClarity lets network managers call up data on defined groups; for example, the performance of a geographic region of the net. The software also can drill down to monitor individual sites, particular boxes at those sites and individual ports on those devices.

In addition to managing Ascend gear, NetClarity manages network devices from Cisco Systems, Inc., Bay Networks, Inc., 3Com Corp. and Digital Equipment Corp. using their proprietary management information bases (MIB). And that allows managers to see and control all devices from a single, central workstation.

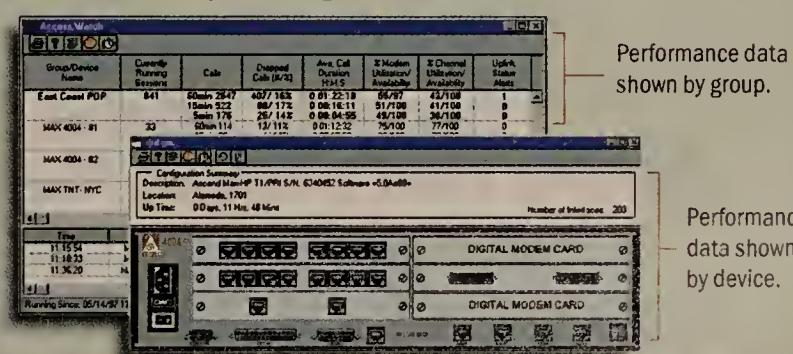
Greg Howard, an analyst with Infonetics Research, Inc., a market research firm in San Jose, Calif., said NetClarity will give users a single tool for monitoring

remote access usage by protocol, service and how much of the time particular devices are being used.

Without NetClarity, users must resort to using "a mishmash of SNMP or custom applications," Howard said.

A VIEW WITH NETCLARITY

Ascend's NetClarity can manage down to the modem.



pending on the model; between \$129 and \$3,995 for MAX devices; and \$4,995 for GRFs.

A NetClarity central management application costs \$4,995, for HP OpenView 4.1, \$2,995 for stand-alone Solaris 2.5 and \$995 for stand-alone Windows NT. Adding support for other vendors' MIBs costs \$4,995 and adding report generation and capacity planning costs \$3,995. ■

Get more information online, including details on modem-management applications from other vendors.



The time is right for Fast Token Ring

A Fast Token Ring (FTR) initiative does not exist, but it should.

FTR, or 16M/100M bit/sec token-ring support, would cure the only real ailment many token-ring network managers face — insufficient bandwidth to the server. And, more importantly, the existence of FTR would rejuvenate the token-ring marketplace and show network managers — and chief information officers — that investing time and money in token ring is not pointless.

Let's take a closer look at the issues. The key difference between Ethernet and token ring is client-side bandwidth. Because of Ethernet's collision-based architecture, the most throughput you can expect to get out of a busy, shared Ethernet is somewhere around 3M to 5M bit/sec. As the LAN gets busier, throughput continues to degrade.

The need for microsegmentation and dedicated LANs became critical years ago for Ethernet.



KEVIN TOLLY

Token ring simply doesn't have a client bandwidth problem. Many times, we've shown that token-ring networks can deliver 15.99M bit/sec of throughput running actual application traffic. And, because token ring is deterministic, that throughput level can remain constant even with many simultaneous users.

On the campus backbone, the situation is under control. The availability of ATM LAN Emulation support for most token-ring switches allows 155M bit/sec pipes between switches.

Additionally, most switch vendors offer ways to "bond" multiple 16M bit/sec ports to provide fatter switch-to-switch connections.

Token-ring strategy has only one gaping hole — server connections. Aggregating traffic from dozens or even hundreds of clients can easily max out a server's 16M bit/sec token-ring connection.

Today, the only way a token-ring network manager can eliminate a server's

bandwidth bottleneck is to outfit the box with ATM or FDDI. Embracing ATM merely to get a fatter pipe to a few servers is not a popular choice. And "upgrading" to FDDI as it moves further off into the sunset is not a strategic choice. Fast Ethernet is another option, but it brings its own set of complications.

All these choices involve incompatible frame formats and require some staff re-training. Give net managers a 16M/100M bit/sec server network interface card and switches with 16M/100M bit/sec ports and their problems would be solved.

Not only could server bottlenecks be cleared instantly, but using FTR ports between switches also would give customers more breathing room before being faced with an upgrade to ATM.

I challenge the vendor community to band together to create an FTR initiative — and to put it on the fast track. Focus on server and switch support, and get products out by year-end.

The need for FTR is clear. Vendors, don't equivocate. If you don't agree with me, make that clear to your customers. Tell them you think it is time they start rippling out their token-ring networks. If you agree with me, take action.

I'll even host a meeting for the group — the Jersey Shore is beautiful in June.

Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at (908) 528-3300 or via the Internet at ktolly@tolly.com.

MPLS

Continued from page 23

to-live (TTL) field, which is how routers count packet hops today, is not optimal for ATM and other Layer 2 technologies, the minutes state. And about MPLS members have begun to disagree on how frequently loops occur and whether the cost of preventing them is defendable.

"There are many routes set up each second, and the tens of milliseconds it takes to correct one link might add up to a substantial cost," the minutes state.

"The IBM approach is to add a fair amount of protocol mechanisms in order to assure that you don't ever create a loop," Swallow said. "You have to apply these techniques even when there isn't a loop, which we also don't think is a great thing. So that's where the major controversy is at the moment."

Swallow acknowledges, though, that discussions on loop prevention are not as heated as in the past and that the MPLS vendors are making some progress.

The group also has to resolve use of label switching with ATM. Cisco wants to figure out a way to run MPLS over existing ATM hardware without requiring standard ATM signalling. Toshiba Corp. is proposing a way to use ATM signalling for MPLS over ATM switched virtual circuits.

Toshiba actually offered three alternatives for IP address resolution and ATM signalling for MPLS over switched virtual circuits: establishing a self-contained MPLS domain; using standard ATM signalling; and combining the two in a "ships in the night" mode of operation.

Each has its drawbacks, the minutes state. For example, a self-contained MPLS domain would result in limited quality-of-service (QoS) support because of inefficient use of bandwidth.

The "ships-in-the-night" approach would require standard IP-to-ATM address resolution, a la NHRP, or pre-configured conversion tables, the minutes state.

The group also has to contend with the possibility that ATM switching hardware

may not accommodate the number of labels needed in a network. Cisco is proposing that ATM Virtual Path Identifier/Virtual Channel Identifier (VPI/VCI) fields hold MPLS labels. But there may be fewer VCIs in switch memory than the number of labels needed.

In addition to ATM interoperability, the MPLS specification should include flow- and reservation-driven approaches to label switching, the minutes state. Currently, the two leading proposals — ARIS and Tag Switching — are topology driven.

"The different operations complement each other, and we have to have the flow-driven [approach] at some point," the minutes state.

Label switching encapsulation is another issue with which the MPLS group must contend. Cisco is proposing a 4-byte MPLS field that includes 19 bits for the label value, 7 bits for the TTL field and 6 bits for "spare" data.

But adding labels to packets and frames may violate the protocol data unit and maximum transmission unit sizes for different media, such as Ethernet, FDDI and frame relay; hence, fragmentation and reassembly procedures need to be defined.

"There is an issue that if you add an extra tag field to something, then you may push against the limit and have to fragment in some circumstances," Cisco's Swallow said.

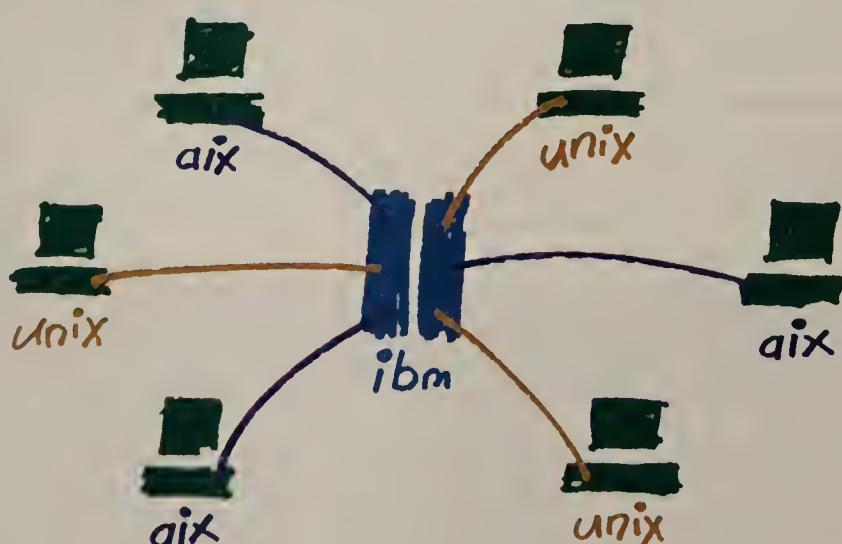
"One has to be prepared to do these sorts of things even though for most of the frame sizes used in the Internet it's not a problem."

Lastly, the group must also resolve MPLS interoperation with the Resource Reservation Protocol (RSVP) and QoS reservations.

It must be possible to use the label to classify flows as RSVP flows.

But changes to RSVP may be required to apply QoS to some label-switched paths, such as multihop tunnels, the minutes state.

Multihop tunnels are explicit paths through the network for carrying Layer 3 traffic. IP nets use destination-based forwarding without a specific path. ■



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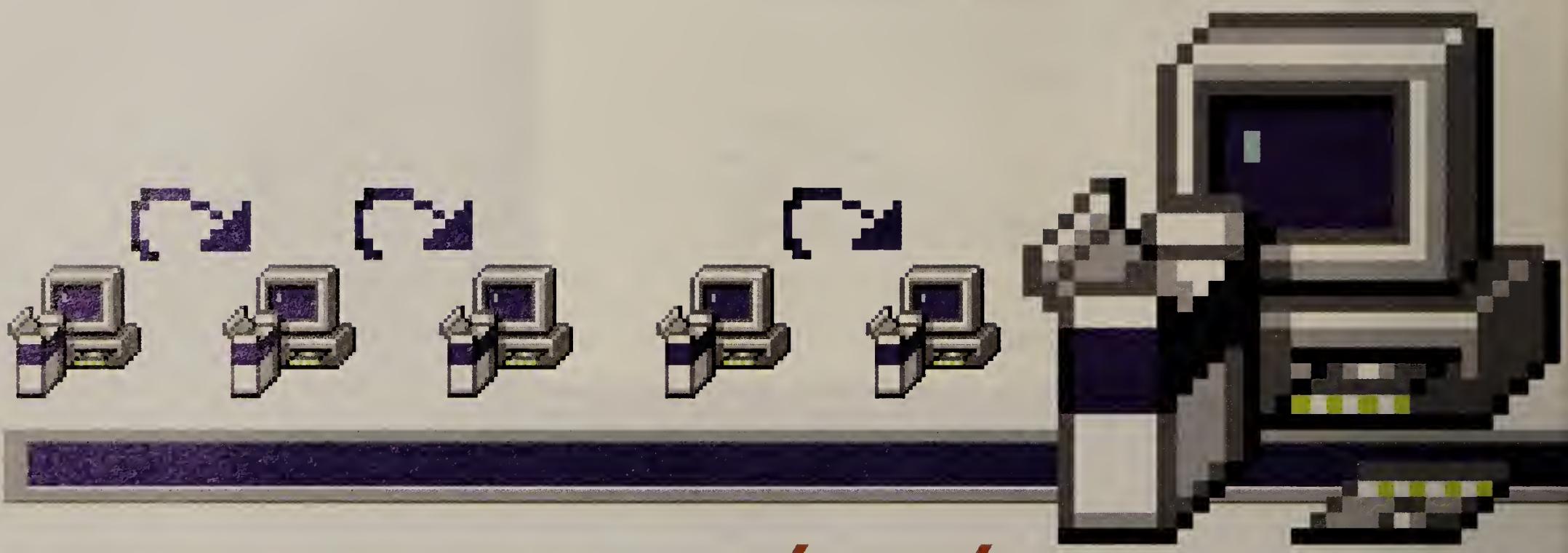


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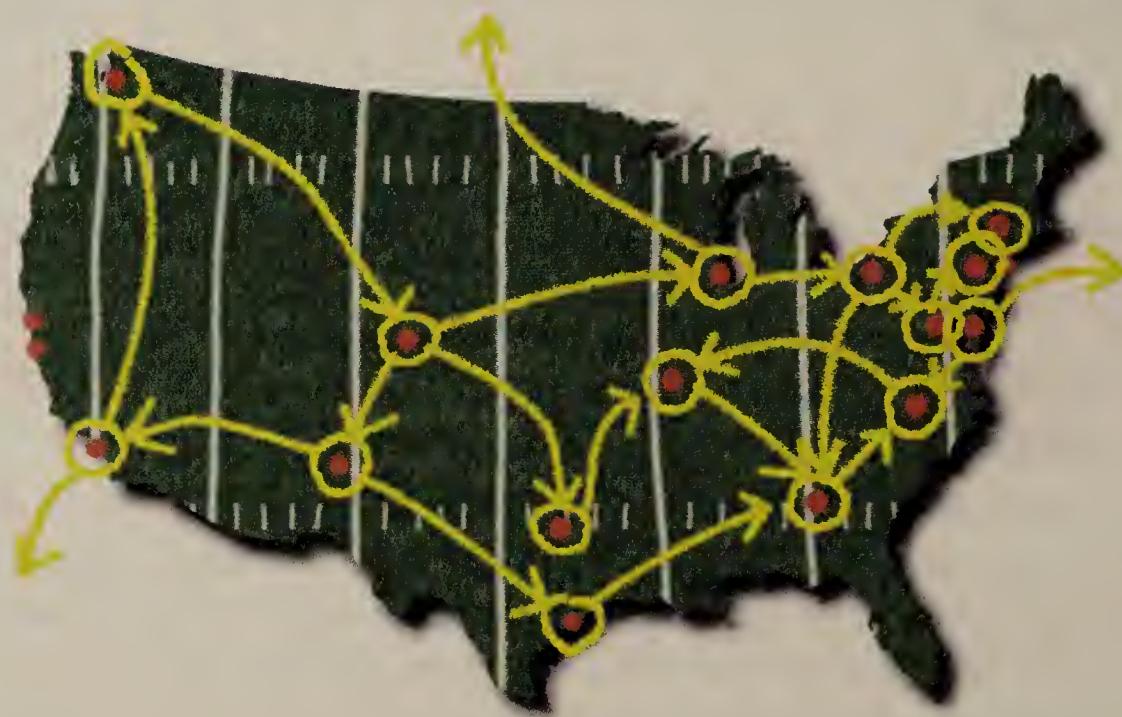


hing of teeth.

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BEFORE.



AFTER.

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—Bruce Bond, President and CEO, ANS Communications

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Briefs

The European Union (EU) approved the pending British Telecommunications plc and MCI Communications Corp. merger earlier this month.

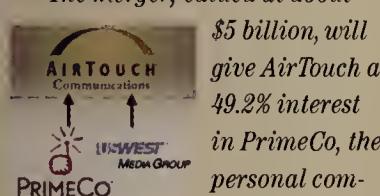
The union still must be approved by the U.S. Department of Justice and the Federal Communications Commission before the two finally become one — Concert Communications. European regulators approved the merger under two conditions. The new company would offer reasonable access, typically called wholesale access, to its trans-Atlantic bandwidth, and Darome Teleconferencing, MCI's U.K.-based audioconferencing business unit, would have to be sold to comply with the EU's approval.

US WEST Media Group and AirTouch Communications, Inc. announced a definitive agreement to merge US WEST's cellular business and its 26.6% interest in PrimeCo Personal Communication into AirTouch.

The merger, valued at about \$5 billion, will give AirTouch a 49.2% interest in PrimeCo, the personal communications services joint venture between US WEST Media, AirTouch, NYNEX Corp. and Bell Atlantic Corp. The merger needs shareholder and federal approval, which the companies expect by year-end.

Senate Commerce Committee Chairman John McCain, R-Ariz., has scheduled a hearing to review the Federal Communications Commission's decision to alter access charges to fund expanded universal service.

McCain has already blasted the decision, complaining that the FCC went too far in subsidizing network access in schools and libraries and predicting that carrier rates will eventually rise.



center over the Internet. The 128-bit key encryption technology is an important feature because it is considered harder to crack than lower bit encryption schemes such as the 56-bit data encryption standard.

The user's data is decrypted at Pilot's network service center before it is sent over a dedicated T-1 connection to the Dynamic Firewall server at the user's corporate headquarters. Essentially, tunneling extends a dedicated T-1 connection to the customer's mobile workforce, said Marketta Silvera, CEO and founder of Pilot.

Other ISPs, including Concentric Network Corp., BBN Corp.'s BBN Planet and WorldCom, Inc.'s UUNET Technologies, all support secure remote

ISPs move to secure remote intranet access

By Denise Pappalardo
Alameda, Calif.

Pilot Network Services, Inc. is the latest Internet service provider to offer remote end users secure access to corporate intranets.

Pilot's new Secure Road Warrior is an extension of its Dynamic Firewall service. Pilot's existing managed firewall offering.

Secure Road Warrior lets network managers outsource their remote access connectivity securely using IP tunneling and 128-bit key encryption technologies.

The service also lets remote users dial in to one of Pilot's network service centers, typically called points of presence, where users are authenticated.

Once the user is authenticated, a 128-bit key encrypted tunnel is established from the user to a Pilot network service

Get more info online:
● Overviews of existing tunneling protocols
● Guides to building your own virtual private network

www.nwfusion.com

access for dial-in users. Concentric's RemoteLink service authenticates users via a Remote Authentication Dial-in User Service server (NW, May 5, page 1).

BBN Planet recently introduced the latest version of its managed firewall service, Site Patrol 3.0 (NW, May 5, page 28). This service supports dedicated, secure Internet access using 56-bit key encryption security. UUNET's ExtraLink Remote service, announced late last year, also supports dial-in users. This service, like BBN's, offers users a managed firewall in addition to an encrypted IP tunnel.

Overall, these remote access services prove that ISPs have found a way to offer customers extra features in addition to ser-

END-TO-END TUNNELS PROVIDE SECURE ACCESS FOR REMOTE WORKERS

Tunneling has become a popular Internet service provider method used to secure remote users' data over the Internet.

Product	Availability	Security	Monthly rate
BBN Planet's Site Patrol 3.0	Now	56-bit DES	\$2,500
Concentric RemoteLink	End of May	RADIUS	\$750 to \$2,500
Pilot Secure Road Warrior	Q3 '97	128-bit key encryption	\$5,000*
UUNET's ExtraLink Remote	Q3 '97	56-bit DES	\$5,000

*Preliminary pricing, which includes a dedicated T-1 from the user to a Pilot POP.

vices to which they already subscribe, said Dan Taylor, senior analyst at Aberdeen Group, Inc., a Boston-based consulting firm. Most of the services, especially those offered by Pilot, BBN Planet and UUNET, are based on managed firewall services.

Pilot's Secure Road Warrior

service is expected by the end of the third quarter. While final service rates are not available, users can expect to pay more than \$5,000 per month, which is the base price for Pilot's Dynamic Firewall service, Silvera said.

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Cheaper ATM could be on the way

By Tim Greene

The day when ATM becomes a less expensive way to provide access to corporate resources may finally be here, thanks to an old standby—the multiplexer.

ATM-based multiplexers from vendors such as Cisco Systems, Inc. and Yurie Systems, Inc.—deployed at the edge of carrier-based networks fed by a variety of ATM or non-ATM network devices—can lower carrier service provisioning costs and offer users more flexible services.

For example, rather than tying up a typical 45M bit/sec port on a carrier ATM switch for a customer who needs only 3M bit/sec, the carrier could feed the customer off a port on a multiplexer.

The muxes, which would be part of the carrier network, would let carriers remotely make quick changes in bandwidth to accommodate new or temporary customer needs, such as videoconferencing.

That improved efficiency could translate into lower prices for users, according to Thomas Nolle, president of CIMI Corp., a

technology assessment firm in Voorhees, N.J.

In addition, customers could collapse all their remote traffic—voice, video and data—onto a single ATM transport. That would simplify their networks by eliminating the need for an on-site ATM switch, according to Mike Grubbs, a group manager of product management for Sprint Corp.

While ATM multiplexers have been available since 1994,

HOPEFUL HOTSHOTS IN ATM ACCESS

Top competitors in the ATM access concentrator market that convert traditional LAN traffic to ATM:

Company	Products
3Com	9600 and AccessBuilder 9010 ATM access muxes
ADC Kentrox	AAC-1 and AAC-3 ATM access muxes
Cisco	3800 ATM access mux
Data Labs	VA1000 (sold by Yurie as the LDR5) and VA1000C (sold by 3Com as the AccessBuilder 9010) ATM access mux
Yurie	LDR200 ATM access concentrator, LDR50 ATM service mux and LDR5 ATM access device

Cisco's recent entry into the market—with the Model 3800 mux—has sparked interest and lent credibility to existing devices.

Similar offerings from smaller vendors have recently come to market, all of which recognize that the vision of ATM as a widely deployed, end-to-end, multimedia transport technology is not coming anytime soon.

"Everybody wanted to believe faster is better, but we got too fast and too expensive for the market," Nolle said.

Now vendors are developing boxes that run legacy voice and data applications, convert the traffic to ATM and tie them in to a low-speed ATM line.

The lines are aggregated by pure ATM muxes to feed carrier switches.

While carriers have not presented any new ATM mux-based services like this yet, they seem to be moving in that direction, analysts said. For example, Yurie has sold its devices for trials to AT&T, MCI Communications Corp. and Sprint Corp. in recent weeks. ■

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Pander power still sparks Washington

Suspend disbelief for a moment and imagine the following scenario: It's 1989, and PCs running DOS with 386 processing power are selling for about

\$2,000. Congress, noting the influence of computers on people's lives, creates the Federal Computer Commission to regulate hardware and software. Over the next

eight years, PC makers boost their prices to \$3,000 with no increase in processing power or improvements in the user interface.

Now it's 1997, and the government orders Intel Corp. to reduce the price of its chips a fraction, extracting a promise from PC makers to reduce their prices by 5%. The chairman of the Federal Com-

puter Commission declares it a great day for America.

Ridiculous, you say? Well, now you have an idea of the farce surrounding the Federal Communications Commission's recent decisions on access charges and universal service. In exchange for a modest reduction in access charges by local exchange carriers, AT&T agreed to make the first cut in its basic tariff schedule since 1989. Never mind that AT&T has raised its tariff rates about 30% since 1989.

And never mind that some companies will now see their costs increase because of new monthly per-line charges to subsidize Internet access by schools. The important thing is that FCC Chairman Reed Hundt got to take credit for AT&T's price cut, a trivial and almost embarrassing action for which nobody should be taking any credit.

This has happened before. In 1995, AT&T desperately wanted the FCC to declare it a "non-dominant carrier" so it could be regulated in the same way as MCI Communications Corp. and Sprint Corp. So AT&T wrote Hundt a letter making certain promises, including one to run "public service announcements" offering folks a cut rate on the company's basic tariff. AT&T assures me those commercials did run, and I'm sure they're right. But I never saw them. Did you?

FCC commissioners often complain that corporations waltz into their offices insisting they have users in mind when they're really just trying to protect their turf. But Hundt lets his guard down if you know how to state your case. Lobbyists all over Washington know the FCC chairman is not satisfied being a phone regulator, but instead pictures himself as a social reformer. Wrap anything in the mantle of children, doctors, schools or even general liberal sensibilities and the regulator falls at your feet. AT&T's "public service announcement" gambit was a masterstroke, redolent of do-good corporate responsibility.

Last year, Apple Computer, Inc. got the FCC to ignore its policy of selling radio spectrum and give away a huge slice of bandwidth for wireless LAN deployment in schools. Now Apple is scaling back its wireless LAN project as part of its corporate reorganization. Can you blame it? The wireless LAN market is about as blah as you can get, and Apple has more pressing problems to attend to.

Apple was simply doing what so many carriers do — pandering to regulators to help create, or prevent, a possible business opportunity. Perhaps if the FCC chairman and his colleagues stopped falling for these tactics, they'd be less surprised that real telecom reform is stuck in the mud, despite all their hard work.

Rohde is Network World senior editor of Carriers & ISPs. He can be reached at david_rohde@nwfw.com.

With Private Line Costs Hitting The Stratosphere, You May Need A Little Help.



DAVID ROHDE

Sprint and MCI seem to raise private line rates all the time, leaving many companies in a free fall. To the rescue comes Tel-Save, a nationwide telecommunications provider with some very down-to-earth prices that won't change for three years.

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Chicago	Los Angeles	\$4,551	\$11,004	59%	\$9,964	54%	\$9,892	54%

Tel-Save stabilized rates pursuant to AT&T Contract Tariff 2039, AT&T rates based on FCC Tariff 9. MCI and Sprint rates were obtained from tariffs supplied by the Center for Communications Management Information of Rockville, MD. Competitors' rates subject to change.

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Telecom Billing

Contracts integrated, bills not

By David Rohde

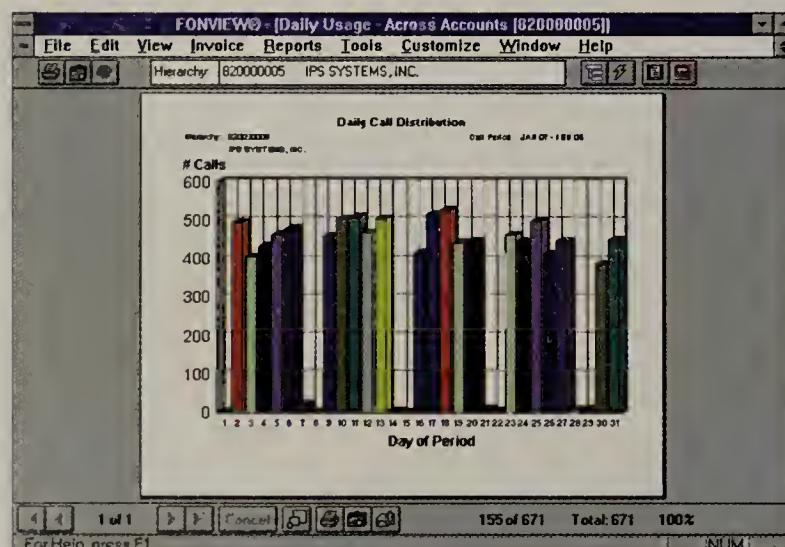
Congratulations! You've just signed a term agreement with a major long-distance carrier for a bundle of voice and data services on a single contract for the maximum possible volume discounts.

Now try to get all the services, with complete accounting for circuit and call detail charges, on a single monthly bill. Can't do it? Well, you may be waiting quite a while to reach that nirvana.

Since carriers almost always offer larger discounts for larger volumes, you can save more money by counting as many services as possible together.

That's why, to win customer contracts, AT&T over the past few months has been adding data services such as frame relay to its OneNet contract. For several years, the one Net Contract has combined outbound calling over its Software Defined Network (SDN) platform with inbound calling on its Megacom 800 service. But that doesn't mean you'll see all the usage in the same bill with the same format — at least not yet.

Over the years, the carriers have made great strides in providing the bill for traditional telecommunications services in electronic formats. During the mid-1990s, all of the major carriers put their outbound and inbound call detail reports on formats such as diskettes and CD-ROMs and gradually introduced Windows-based access. The best reports allow you to see summaries of charges racked up by



Sprint's FONView for Windows 6.3 can take raw data, such as the number of outbound calls placed from a given location or department on each day of the month, and represent it as a bar chart.

departments — defined by accounting codes — and let you click on those summaries to see the call detail. This gives telecommunications managers the ability to charge back the amount of money each department or internal organization spent.

But integrating data services — particularly packet data services that charge according to port speed and contracted level of guaranteed packet delivery, rather than mileage or call duration — has proven to be a bigger nut to crack.

A WINDOW INTO WHAT YOU'RE SPENDING

The carriers' Windows-based usage analysis tools and the number of standard reports available on each:



Carrier	Name of service	Number of standard reports
AT&T	Billing Edge	160
MCI	Perspective	30
Sprint	FONView	60

That's a point MCI Communications Corp. officials emphasize when trying to woo away AT&T customers. "AT&T has handled integration from a contractual standpoint, but they still sell services as individual stovepipes," says Ron McMurtrie, MCI's newly named executive director of integration services.

MCI is promoting its networkMCI One service, which totals domestic and international long-distance charges and adds cellular, paging and Internet access charges on one bill. MCI officials claim they can even add local service charges under MCI's thrust into the local exchange business.

Order entry via the Web

But networkMCI One does not offer the complete range of voice and data services for which large corporations typically contract. MCI has also faced the challenge of integrating the billing for all these services.

Later this year, MCI hopes to include frame relay, ATM and Switched Multi-megabit Data Service charges on its traditional telecom bills, according to McMurtrie. The reason MCI has been unable to do that is its frame relay billing system comes from the company's acquisition some years ago of Telecom USA, according to Frank Slavick, a senior consultant at TeleChoice, Inc., a consulting firm in Verona, N.J.

In addition, MCI has scaled back a major reengineering project called Horizon that would have changed the carrier's method of provisioning new services and delivering bills.

The idea behind Horizon was to add a graphical user interface to mainframe systems so MCI employees could enter customer service, pricing, billing and reporting data, which would speed the inputting of information.

Then, with hooks into MCI service platforms such as Vnet and ISDN, MCI would deliver bills based on schedules devised individually with customers (NW,

Sept. 16, 1996, page 33). Now MCI is changing its order entry interfaces to Web-based links, McMurtrie says. "We have shut down most of the aspects of Horizon," he says.

Billing Edge makes the grade

For all its integration challenges, analysts give AT&T a lot of credit for providing a useful level of detail with its Billing Edge desktop analysis software. Billing Edge is used with the traditional OneNet service, which consists of outbound SDN and inbound calling.

Under Billing Edge, every month AT&T provides a CD-ROM containing the OneNet service billing information. Billing Edge offers more than 160 standard reports that highlight key information. For example, telecom administrators can analyze inbound calls by 800 number, area code of the originating calls or even ZIP codes of the originating calls.

Billing Edge also maintains a rolling 13-month window of certain summary data, allowing users to examine calling trends over the previous 13 months. Users can also modify standard reports or create custom reports from scratch and save the report format to reuse when the next batch of data comes in.

Private lines now, frame relay later

Over the years, Sprint Corp. has played leapfrog with AT&T on its billing software. It introduced FONView for DOS in 1989 and FONView for Windows in 1995. The current version, FONView 6.3 for Windows, was introduced last March. It offers 69 canned reports and, as with Billing Edge, users can create their own ad hoc reporting capabilities and devise bar and pie charts (see graphic).

About four years ago, Sprint built a gateway from its Invoice Processing System (IPS) into its private-line provisioning system. The gateway allows users to see on FONView their monthly charges for dedicated access lines and long-distance dedicated circuits, says Jim Woodard, Sprint's director of invoicing and reporting for business services.

But Sprint has built separate order entry and billing systems for frame relay and ATM services, including variations of those services, in which Sprint configures and manages users' routers and other customer premises equipment.

Now, under a project dubbed Data One, Sprint is developing a "rating engine" that enables the IPS to collect usage data from Sprint's fast-packet switches in a fashion analogous to the way it pulls message-unit information from its Northern Telecom, Inc. DMS-250 voice network switches.

The goal is to enable the IPS to do all the billing for all of Sprint's services and to end separate billing for frame relay and ATM, Woodard says. Once the IPS can bill for frame relay, the next step would be to add such usage to the FONView reports. Sprint users can expect to see the first fruits of this effort next year, TeleChoice's Slavick says. ■

Scheduling tool gains Web hooks

By Paul McNamara

Aliso Viejo, Calif.

Russell Information Sciences, Inc. last week announced CM-Web, server-based group scheduling software that can be accessed from standard browsers.

CM-Web allows browser users to schedule conflict-free meetings or reserve shared facilities almost instantly, without relying on the vagaries of E-mail.

"It's not E-mail-based, so you don't suffer the possibility of lost or delayed up-

dates to people's calendars," said Mark Peabody, a research analyst at Aberdeen Group, Inc., a Boston consultancy. "The fact that it is viewable from any standard Web browser will have a big effect, especially as [vendors] start to put browsers into more portable and handheld devices."

Although the firm is promising support for additional platforms, CM-Web

runs only on Windows NT and in concert with Russell's client/server Calendar Manager product. In addition to NT, Calendar Manager supports HP-UX, Solaris, Digital Unix, NetWare and OpenVMS servers, as well as Windows, Mac OS and OpenVMS on the client side.

CM-Web displays calendar entries in appointment, daily, weekly and monthly formats. Postings may include URLs, which CM-Web automatically converts into hotlinks.

CM-Web's server-based architecture limits the strain on network resources, company officials said.

PROFILE: RUSSELL INFORMATION SCIENCES, INC.

Based: Aliso Viejo, Calif.

Founded: 1974

Primary product: Calendar Manager, client/server scheduling software designed to work across an enterprise in real time

Management: Richard Russell, founder, president and CEO

Patrice Russell, vice president of finance and operations

Mark Russell, vice president of technology

"The key thing is there is only one copy of the master schedule on the network at any one time," said company President Richard Russell.

The software could become an important tool for end users at Bayer Corp. in West Haven, Conn., said Sam Lovejoy, a staff analyst at the Russell customer. He said Internet support would give end users access to their calendars from almost anywhere and cut down on the need for IS to maintain client-based calendaring software.

CM-Web costs \$995 as an add-on to a Calendar Manager installation. Calendar Manager is priced at \$49 per client for 5,000 users.

& Russell: (714) 362-4000

Sovereign Hill

Continued from page 23

of user-defined profiles can run on a server.

"Unlike the push products that will indiscriminately push information at you, you interact with the [user interface] to continually fine-tune what kind of information you're looking for, so you get a very high level of accuracy and relevance," Champagne said.

InFilter is available on various Unix platforms. The cost is \$499 for a 10-user package. Additional pricing options are available.

The numbering of the current releases of InQuery and InFilter, neither of which are first versions, reflects the fact that they were previously sold to companies that were members of the Center for Intelligent Information Retrieval.

& Sovereign Hill: (800) 444-2616

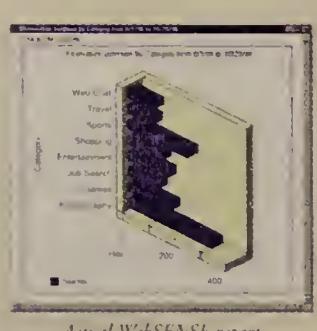


What's wrong is that it appears "Joe Worker" is hard at work. But what's really going on is frivolous surfing.

The truth is 40-60% of Internet activity is spent in unproductive sites and all this "inactivity" is costing corporations thousands of dollars in lost productivity. Employees may look busy but the reality is they're spending too much time in non-business related sites.

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Religious conversions

In 1992, the war of words was waged over routers vs. bridges. Now we are arguing routers vs. switches.

"Switch when you can and route when you must" is a mantra one often hears from switching salesdroids.

They claim switching is faster, simpler, cheaper and smells better than routing. This is not a new ideological conflict. It goes back many years to a time when some companies were building nationwide bridged DECnet and SNA networks and



Scott Bradner

routing was some esoteric, weird thing IP guys did in dark rooms. It seemed to die down for a while as IP became mainstream, but has now flared up again with the advent of Ethernet switches — even if many Ethernet switches are just multiport bridges with a marketing makeover.

But I am more than a bit suspicious that much of the religious-like fervor about switches comes less from architectural purity than from product family — that is, what the salesdroid wants to sell you.

Part of the fear, uncertainty

and doubt (FUD) in this issue involves misconceptions about the performance of routing. This is perfectly exemplified by an article published in this paper a few weeks ago that said IP switching can help users avoid "time-consuming route table lookups."

Far be it for me to bring actual facts to the discussion — they do so distort the perceptions — but in the Harvard Network Device Test Lab, we measured the forwarding latency of a Cisco Systems, Inc. Catalyst 5000, a Level 2 Ethernet switch, at 66 msec. We measured the forwarding latency of a Bay Networks, Inc. Switch Node, a Level 3 IP router, at 72 msec. Thus, the "time-consuming route table lookups" took about an additional 6 msec in the Switch Node.

Somehow I do not think a difference of 6 msec in router forwarding latency is going to be all that noticeable in a system latency that, at best, will be in the tens of msec and will be closer to 100 msec in many cases. And just to be clear, this processing is pipelined so these devices for-

ward packets at wire rate, as many routers have been able to do for a number of years.

Note also that buffering delays can dwarf processing delays. It takes 1.2 msec to transmit one 1,518-byte packet on a 10M bit/sec Ethernet. It does not matter if the device is a switch or a router; if that packet is in front of your packet, your packet will be delayed by at least 1.2 msec.

Latency and its impact is just one example of the arguments used against routers, and I, as a strong proponent of routing, expect I could counter most. But that may not be required. A number of switch companies are starting to come out with Level 3 switches, most of which are just fast, cheap routers with marketing makeovers.

I am already starting to see the painful process of mental realignment going on in the sales forces of these companies. After years of damning routing, they now must start to praise the concept. It is a fun conversion to watch.

Disclaimer: To ensure noninterference with the rest of us, Harvard has a separate school for religion, but I did not consult it for this column.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached via the Internet at sob@harvard.edu.

Lotus details Domino Web and mail server strategy

By Sari Kalin

Cambridge, Mass.

Lotus Development Corp. last week outlined plans for its Domino server and Notes client product lines, including a price hike for Domino later this year.

Domino 4.6 will be priced at \$1,495, a \$500 increase, according to Brenda Kelly, director of marketing for Lotus Internet products.

For the added cost, Domino 4.6 will support more Internet standards than Version 4.5, specifically Internet Message Access Protocol 4 (IMAP4) for access by Internet mail clients and Network News Transfer Protocol for access by Internet newsreaders, Kelly said.

Among other new features, Domino 4.6 will support Lightweight Directory Access Protocol for directory access and Secure Sockets Layer 3.0 certificate authorization and management.

Lotus also improved Domino's integration with Java — including the ability to put Java applets in the Notes object store — and has enabled Domino to be administered via a Web browser.

In addition, Lotus said pricing for Domino Mail 4.6, an Internet messaging server an-

nounced last month, will be \$995. It will enter beta testing along with Domino 4.6 by the end of May and be generally available in the third quarter.

Lotus Go Webserver 5.0, an entry-level Web publishing server also announced last month, will be priced at \$495. Lotus Go Webserver Pro, a tool kit that includes NetObjects' Fusion 2.01 HTML page design tool and Lotus' forthcoming BeanMachine 1.0 Java applet development tool, will be priced at \$795. The Lotus Go products, in beta testing now, will be released in July, Kelly said.

In addition to releasing server pricing and availability, Lotus announced that beta versions of its Notes Desktop 4.6 and Notes Mail 4.6 clients for Windows 95 and Windows NT will be available on the Web this week (www.lotus.com/notes/). Client prices will stay the same: \$55 for Notes Mail and \$69 for the Notes Desktop, Kelly said.

The final versions of the clients are due in the third quarter and will be available for Unix as well as Windows 95 and Windows NT, she said.

Kalin is an IDG News Service correspondent in Boston.

SHARED LOGIC

The importance of intranet teamwork

Don't underestimate the amount of new work intranet applications will create.

It's easy to underestimate the impact intranet applications can have on a company's organizational structure and processes.

The more Web, groupware and collaborative tools a company puts in place, the more complex organizations tend to become. And then you need even better intranet applications to ensure that the new teams, processes and virtual groups run efficiently.

For example, many IS departments are trying to get closer to the companies' end users they support. In some organizations, parts of the IS department report to different business units as well as to IS. With such organizational change, more sophisticated systems are needed to support team-based communica-

cations and decision making.

Team software must be easy to use and universally accessible through a consistent approach, such as E-mail and Web browsers. However, this alone is not enough, as anyone familiar with an overflowing mailbox or cluttered Web server can tell you. Team software must actively structure and coordinate the work that takes place on your company's intranet.

To support teams working on behalf of complex, matrixed organizations, companies must deploy groupware technology to plan meetings, track meeting agendas, post minutes and track action items. In addition, the

technology must allow informal electronic discussions between meetings.

Team software must also be linked to workflows, in which a process consists of a flow of defined activities involving documents, document templates, roles and action items. There has to be synergy between groupware for teams and workflow software for process management, with flexibility to enable processes to support teams, team-driven processes or process-driven teams. For example, an action item in a groupware database for a high-level team could point to a low-level process, such as developing a



Daniel Blum

requirements document.

When all is said and done, the true value of team- and process-management software can only be realized through a consistent, intranetwide deployment, as well as management procedures that take full advantage of the technology.

If consistency exists, employees become more portable across teams and processes. Newly assigned team members can quickly absorb the "organizational memory" of the teams' shared databases. Or once you have established a process, employees can immediately be part of it, get an explanation of the process and use templates to perform tasks in a consistent way.

Executives from the CEO down can examine the detailed work of the lowest level team if necessary. Summary activities of many teams can be rolled up into management reports. Links can be established between strategy and tactics.

Sound too good to be true? Or do you already have a dream

If consistency exists, employees become more portable across teams and processes. Newly assigned team members can quickly absorb the "organizational memory" of the teams' shared databases.

system in place? Let me know if you've been able to build state-of-the-art team/process coordination systems on top of your intranet communications and collaboration infrastructures.

Blum is a principal at Rapport Communication. He can be reached via dblum@mindspring.com or www.rapport.com. Call (800) 643-4668 for details about Blum's Next Generation Messaging seminar sponsored by Network World and Rapport.

Technology Update

Covering: Evolving Technologies and Standards

NUTTER'S NETWORK HELP DESK

Ron Nutter, a Master Certified Novell Engineer and Groupware CNE in the Lexington, Ky., area, tracks down the answers to your questions. Call (800) 622-1108, Ext. 476, or send your questions to rutter@world.std.com.

My client has a four-terminal Windows 95 network that is used for sharing a Hewlett-Packard Co. 5MP laserjet printer and, occasionally, some files. It recently began experiencing problems printing statements, each of which is sent as an individual print job, from an accounts receivable application on one of the terminals when the number of statements reaches approximately 300.

The largest number of completed print jobs is 254. The rest are placed in the printer's spool. The status never changes, and the print job owner is never updated. However, if I attach a printer to the LPT1 port of the computer sending the statements, the jobs print without a problem. That computer is a 100-MHz Pentium with 16M bytes of memory and no shortage of hard drive space for the printer spool.

Via the Internet

I'd add at least 16M bytes of RAM to the computer that functions as the print server.

After you've done so, click on the My Computer icon with the mouse's right button, select Properties and then click on the Performance tab. Follow this by clicking on the File System tab and changing the computer type to network server. This should make the computer a little faster in handling the print tasks and help avoid timing problems.

If you use Windows 95's initial release and haven't already done so, you should download (from Microsoft Corp.'s Web site) and apply the Windows 95 Server Pack 1.

In case the problem relates to the printer port, you also should download a newer LPT.VXD driver. However, you may need to dummy up the driver to slow down the rate at which it sends data to the port. To do so, change the LPT driver for the port to indicate that it is just an LPT port and not a higher speed parallel port. Some hardware ports have trouble accommodating faster speeds.

Class-based queuing: Managing broadband access to the Internet

By Ashley Stephenson

With class-based queuing (CBQ), an advanced traffic management technique, enterprise network operations staff can implement the management features needed to effectively scale to higher Internet access speeds.

And while network managers use CBQ to gain control of high-speed Internet access, service providers can use CBQ to optimize billable bandwidth capacity.

CBQ is a public domain networking technique that can accommodate all network speeds. It is ideally suited for business-critical, high-speed services because of the benefits of advanced traffic management. Network managers should consider CBQ support an important requirement when evaluating high-speed access products.

Many enterprise networks hit the T-1 speed barrier when delivering Internet access to users, partly because of the inability to allocate, prioritize and administer bandwidth within the organization. When users begin to complain about response times, these organizations historically have tried using additional T-1 circuits and inverse multiplexing the Internet access connection. But this can be expensive and awkward. What's more, it doesn't provide much management flexibility.

A more scalable and flexible approach is provided by buying a 45M bit/sec T-3 or 155M bit/sec OC-3 access circuit and managing bandwidth as it is allocated to users or applications. By considering CBQ features, network managers can prioritize traffic for high-speed Internet access and cost-effectively manage broadband links.

Get in queue

Queuing technology has been available for years, but prior methods were typically narrowly targeted implementations with limitations. Priority queuing, for example, is a straightforward method of ranking traf-

fic flows — for example, "A" before "B" before "C." Starvation is a common limitation of simple priority queuing mechanisms.

Fair queuing (FQ) assumes traffic can be effectively separated into well-identified flows so each flow receives an equal share of transmission bandwidth. A single-user PC and a multiuser server sharing a link would each conceivably receive the same share of bandwidth. Weighted fair queuing (WFQ), on the

Group at Lawrence Livermore National Laboratory developed CBQ as a superset of existing queuing technologies. This link-sharing technology allows traffic flows or "classes" to be characterized by multiple attributes, with the classes organized in a hierarchical structure.

Each class is defined with an average data rate. If a class is not using its full bandwidth, synchronization features alert other classes that bandwidth is available, allowing them to "borrow"

This methodology provides an automated redistribution of idle bandwidth.

CBQ is good for managing high-speed Internet connections because it allows the enterprise to reduce costs by purchasing bandwidth in bulk.

For example, the enterprise could establish a T-3 or OC-3 connection for the cost of several T-1 links and distribute incremental bandwidth throughout the organization.

Network managers could establish usage policies, bill departments for utilization and configure departments for variable, peak, maximum and average usage.

CBQ provides users the ability to control and monitor the distri-

UP CLOSE

The queuing lineup

Class-based queuing, a link-sharing technology, is a good solution for handling the growing demand for Internet access. It's considerably more flexible for managing bandwidth allocation, including Web access, than previous queuing techniques.

Queuing technique	Functionality	Considerations
Priority queuing	Provides simple ranking of traffic flows — "A" before "B" before "C."	Applications can be starved for bandwidth.
Fair queuing	Assumes traffic can be effectively separated into well-identified flows so each receives an equal share of transmission bandwidth.	A single-user PC and a multiuser server sharing a link would each conceivably receive the same share of bandwidth.
Weighted fair queuing	Allows allocation of bandwidth on a variable basis, so not all flows need the same bandwidth allocation.	Network managers cannot dynamically allocate unused bandwidth.
Class-based queuing	Lets traffic flows or "classes" be characterized by multiple attributes, with the classes organized in a hierarchical structure and each class defined with an average data rate.	If a class is not using its full bandwidth, synchronization features alert other classes that bandwidth is available so those classes can borrow resources.

other hand, allows allocation of bandwidth on a variable basis, so not all flows have to have the same bandwidth allocation.

WFQ improves on FQ by allowing administrators to specify dissimilar allocations. WFQ does not, however, let the user specify a way to dynamically allocate unused bandwidth.

On a link where WFQ is employed to provide traffic management, bursty, real-time traffic could be delayed — and latency added — even if unused bandwidth is on the link. The bandwidth must be allocated to the real-time application.

A new approach

The National Research

resources.

Each class of traffic is prioritized, so the higher priority queues are first in line for borrowing resources during periods of link congestion or over-subscription.

CBQ allows definition of service levels and enterprise traffic classes by a range of classification parameters based on Layer 3 information. Traffic can be classified by IP address range, host address, protocol, port or any combination of these parameters.

Hierarchical link-sharing allows multiple agencies, protocol families or traffic types to share bandwidth on a link in a controlled fashion.

bution of bandwidth rates, networking services and quality-of-service access guarantees to all departments, workgroups and desktops requiring access to the Internet or corporate intranet.

It also satisfies the access, performance and cost requirements of key business applications operating over the Internet or intranets.

Stephenson is president and CEO of Xedia Corp., a company in Littleton, Mass., that provides managed broadband Internet access products. He can be reached by phone at (508) 952-6000, Ext. 101, or via the Internet at ashley@xedia.com.



NT is scalable . . . yeah, you bet

Is Windows NT a scalable operating system that can handle enterprise applications?

Microsoft last week shelled out scads of cash and called in chits from Compaq, HP and others to answer that question in the affirmative. But after all the Scalability Day speeches, after the displays were dismantled and the reporters had put down plates and glasses and scattered to their cubbyholes, the real answer hadn't changed. NT is scalable, provided you don't want to scale too high and you're willing to forgo the additional scalability, availability and other advantages Unix offers.

Bill Gates and cohorts, nattily attired in their best business duds, showed NT handling millions of transactions, tens of thousands of users and untold E-mail messages. NT can handle anything, right?

No. Numbers provide a narrow view of scalability. The presentations ignore that Unix still scales to more processors, offers superior clustering and better availability and manageability than today's NT.

Talking with Microsoft partners at the event gave you a sense of the cognitive dissonance at work. Companies such as Digital, Data General and HP are pounding the NT drum, but they still sell Unix as their high-end operating system. Go to their Web sites and read the positioning statements.

If NT is as good as Microsoft and company were making out, then

Unix must be on its deathbed, right? "No, no," these companies were quick to answer. "We've seen some good scalability in NT, but Unix has functionality NT is just getting to now," one Digital exec told me.

In fact, as if to prove that, just one day after Digital and other partners ran big ads in major dailies proclaiming NT's enterprise status, Digital ran another ad proclaiming that its AlphaServers run Netscape's Web site "because netscape.com simply can't afford to be down." Those are AlphaServers based on Digital Unix, folks.

If HP is "getting the NT religion," as a top Microsoft official told me, why are NT servers offered through HP's Personal Systems group and not the Enterprise Servers group, which offers Unix boxes?

A Tandem executive put NT's availability strength in perspective for me. He said the company has an availability ranking system under which Tandem's high-end Himalaya systems, which have been tuned for nonstop operation, get a score of 1. Tandem NT systems using Microsoft's Wolfpack clustering software and specialized Tandem software get a 6. A plain-vanilla NT system gets an availability rating of 50.

Look, NT is getting more enterprise ready every day. It can handle ever-larger applications. But Intel-based machines running NT simply aren't ready for every enterprise application today.

Just because Bill Gates says they are, doesn't mean it is so.

John Gallant, editor in chief

jgallant@nww.com

The Internet • Wayne Spivak

A private news server: Every company needs one

In the beginning of the Internet, man created E-mail. But 'Netizens found it was not enough. So E-mail begot the Network News Transport Protocol (NNTP) server, and the NNTP server begot Usenet, and Usenet began to multiply.

Today, more than 20,000 Usenet public newsgroups cover almost every conceivable topic.

Now is the time to start building private news servers and private newsgroups. Every company, not just computer companies, should install and maintain a private news server. Why? Two simple concepts: customer service and marketing.

A private news server does not take feeds from Usenet. Nor does it supply a feed to any other news server. It is located on a company's host computer, same as the company's Web site.

A full Usenet feed can eat up terabytes of storage and several T-1 lines every day. This is, needless to say, quite expensive. However, a private news server can be established within the limits of your company's Internet strategy. In fact, I run a news server on a 486-based PC with 16M bytes of RAM and a 1.6G-byte hard drive, utilizing Linux. Can't get much more inexpensive than that.

Because the news server doesn't accept or send a feed, the only traffic comes from the users. Depending on the types of newsgroups you create, most traffic will be text, which won't eat up bandwidth or terabytes of disk space.

So how can a private news server help your company? Let's look at Microsoft Corp.'s private news server, msnews.microsoft.com, as an example. This server, which is open to the public, has at least one newsgroup, if not more, for each Microsoft product or product line. There are also groups just for developers — again, open to the public.

In Microsoft's newsgroups, you will find discussions of technical issues, gripes, accolades, suggestions for improvements and bug reports — essentially, every item customer service deals with daily.

Recently, I had a problem with Outlook, Microsoft's new E-mail client. I went to the Outlook newsgroup, skimmed through and found my answer. I never had to post a response. I've also gotten some detailed technical support from end users on how to fix a problem with Microsoft's Internet Information Server.

You may be saying, "This idea seems OK, but it's only for com-

puter companies." Not so. I'm a boater, and I could use a newsgroup to discuss issues about my boat, its operation and maintenance, among other topics. I also own furniture. I could go to a newsgroup that discusses the table I just bought and how to care for and maintain it so one day it will be considered a valuable antique.

Reading these private newsgroups are individuals such as you and I. We learn from what others have discovered. Also learning from private newsgroups are product managers, who are able to find out what's working, what's not, what's hot and what's not — pretty important stuff.

Then there's the customer service potential of private news servers. Customers of every conceivable class and station in life are brought together to discuss product-centric problems. Customer A discusses his or her problem with Customer B. A dialogue ensues, which may lead to A doing business with B. A and B recognize that they met through your newsgroup, promoting additional goodwill toward your company.

Word starts to spread that your company has a great customer service department, providing user groups and product information without requiring that users wait on a phone for eternity.

In addition, users can get firsthand information about other products your company makes and read testimonials from customers.

Setting up a private news server is not all that difficult. Deciding which newsgroups to offer is not that tough, either. Try it. I think you'll like the results.

*Spivak is president and owner of SBA * Consulting, an IT consulting firm, and SBA.NET.WEB, an Internet consulting company. He can be reached at wsprivak@sbanetweb.com.*

MESSAGE QUEUE

Send letters to nwwnews@nww.com or John Gallant, editor in chief, Network World, 161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification.

Blown opportunity

Regarding Howard Anderson's opinion column, "A network prescription: Blow it up, start over" (April 21, page 39):

These recognized experts for hire are all alike. When something like videotext is on the rise, they characterize it as the latest thing since sliced bread. Then when it's obvious to even the most uninformed cretin that a particular technology is in decline, they safely proclaim it dead or dying.

With the same mastery of strategic foresight and valiant conviction, Anderson now sees the Internet's ability to support virtual private network



A 'Web of distrust' would expose 'Net outlaws

Intranet, extranet and Internet security depends greatly on whether we can trust the software components—Java applets, ActiveX controls, browser plug-ins and the like—being downloaded and installed continuously by browsers everywhere.

We won't have vigorous electronic commerce until there are industry-standard, tamperproof, virtual containers for transmitting software components from Point A to Point B. The industry must settle on a single framework for digitally certifying, publishing and downloading applets and other software/content modules.

Today, there are three principal competing Internet content-certification technologies: Microsoft Corp.'s Authenticode, Netscape Communications Corp.'s Object Signing and Sun Microsystems, Inc.'s JavaSecurity APIs. There should be just one. Application developers should not be forced to choose among these schemes or waste resources developing applications for all three.

But even if these competing standards were merged immediately and everyone used the same certification APIs, we still wouldn't be safe from outlaw code on the 'Net. Digital certificates use cryptographic technology to verify that an applet or other piece of code was issued by its purported originator and has been transmitted intact and unmodified. In other words, a certificate vouches for someone's authenticity, not his good intentions.

Certificates are a basic capability of most leading-edge browser and messaging environments supporting Secure Sockets Layer and Secure Multi-purpose Internet Mail Extensions. To protect your intranets, you will have to grapple with the issue of whether a software publisher and its certification authority (CA)—the third party that issued the digital certificate—is trustworthy.

Digital certificates are only as useful as the criteria users employ to determine whether the associated download is a risk worth accepting. Certificate-enabled browsers, such as Microsoft's Internet Explorer, usually ask users whether they wish to accept or reject a download before installing it locally. Users can set up their browser to accept all certificates coming from particular software publishers or CAs, block downloads from particular sources or block unsigned downloads. Prior to accepting a certificate, the user may also hyperlink to the Web site of the software publisher or CA for more information.

In this new order, we'll be relying heavily—perhaps inordinately—on CAs to tell us whether one applet is more trustworthy than another. That's a serious vulnerability for the industry as a whole, because CAs will have neither the mandate, resources

nor inclination to monitor millions of certificate holders for good behavior.

CAs have a vested interest in certifying as many people, organizations and software publishers as possible—at a fee—and keeping them in good standing. They only perform background checks on organizations seeking the highest certification levels and are not likely to show a similar level of investigative diligence at certificate renewal time.

Perhaps most serious, CAs do not provide the type of in-depth profile information users would need to evaluate whether to install a particular applet. In practice, few certificates are rejected because users do not have the information needed to evaluate the risk properly. They're also in a hurry to download the goodies that await.

This is a dangerous state of affairs because it leaves the door wide open for viruses, industrial spies and other nasties to arrive on our desktops via the browser.

What's missing from leading Internet vendors' "trust-based" digital certification models is an online, independent watchdog that provides users with timely alerts on hazardous or questionable software.

I'm calling on the industry to set up what I would call a "Web of distrust"—distributed online newsgroups of sorts dedicated to alerting users of hazardous downloadables.

Users should be allowed hyperlink access to this newsgroup—as well as to the Web sites of software publishers and certification authorities—before they press the fateful "accept" button.

Let Microsoft, Netscape and Sun know your opinion on this issue. You can best educate yourself on their trust-based certification models by reviewing their respective white papers on the topic at:

- www.microsoft.com/security/swdownload1.htm
- www.netscape.com/assist/security/objectsign/datasheet.html
- www.javasoft.com/products/jdk/1.1/docs/guide/security/index.html

Our best defense against malignant applets is to pool our experiences, expose the offending code-mongers to the entire online 'Net community and thereby burn them out of existence.

Kobielski, a contributing editor to Network World, is a senior telecommunications analyst with LCC International, Inc., a McLean, Va.-based network design, engineering and integration firm. He can be reached at (703) 873-2474 or via the Internet at kobielski_james@lccinc.com. The opinions expressed are his own.



applications as the next great bandwagon to jump on. Such bravado? I think not.

I'm not challenging Anderson's observations or thought process here. I'm just more than a little puzzled why he would depict his position as being so "out there."

Frankly, I for one am not impressed by Anderson's predictions, as I find them firmly seated within his apparent "safe zone."

Here's an idea: Instead of disparaging the obvious sacred cows out there in traditional IT-land, why doesn't Anderson make an attempt to comment on the nascent potential of a faint glimmering star on the distant horizon—something obviously beyond his safe zone.

*David Deans
Senior partner
Deans & Associates
Phoenix*

The end is near

Regarding your editorial, "The end of the open Web" (April 28, page 46):

Microsoft Corp. is by far the leading offender in the standards wars. I purchase Microsoft products only when the application is absolutely, positively unavailable anywhere else.

So other than for desktop operating system software, Microsoft just doesn't get much of my business.

You're probably right that things won't change much until the next paradigm shift (network computers?). But until then, all we customers can do is find vendors other than Microsoft to do business with.

*Alan Wells
Technical adviser
Federal Express Corp.
Memphis, Tenn.*

I hope your editorial, "The end of the open Web," opens

some eyes. I, too, am worried that the free and open Internet will be demolished by a new, costly, proprietary Internet.

The same thing happened to PCs some 15 years ago. Computer operating systems should have been free and open. But some people decided that they could make a lot of money if they made proprietary systems.

Of course, the losers of this game were users. Not only do users have to pay for their operating systems, but what they are buying is inferior and buggy.

This isn't an anti-Microsoft speech. I'm not happy with any commercial operating systems. I guess that's why I'm a tried-and-true Linux fan. FreeBSD is also a good package.

If people want to make money, they should do it the old-fashioned way: Make a product that customers want to buy, not one they have to buy just so they

can use the products they really want. That's what is happening to the Internet. Soon people will have to buy two or more products just to get the one they really want.

The basics should be free. If you want more than the basics,

TeleToons



you can pay for what you want. We should not have to buy unreliable systems just to get the basics.

*David DeCesare
Engineer
Lifetouch National School Studios
Minneapolis*

Phil Frank and Joe Troise baba@sfgate.com

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References:

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Hobbies:

Street hockey. Softball. Surfing the Net. Chess.

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Building a Next-Generation corporate network

By Tom Stenson

Advice from the trenches: How to regroup around the latest switching and routing technologies.

For more than 10 years, Tom Stenson was a network manager at State Street Corp., a large bank and financial services company based in Boston. Last month, he gave up his position as vice president of network architecture to join several associates in forming a consultancy specializing in the design, implementation and troubleshooting of corporate networks.

At State Street, Stenson gained extensive experience building and operating a complex global network and had the opportunity to listen to many vendor claims and test those claims in practice.

Like all of you, he ultimately had to make difficult network design decisions and product choices.

Here, he applies the benefit of his experience to the task of designing campus networks in the age of Layer 3 switches, ATM and Gigabit Ethernet.

If you are a network manager or an architect at a major corporation and have had experiences at all similar to mine, you probably made many of your most critical network design decisions during the early 1990s. You then spent the next couple years scaling and deploying your network to all corners of the corpo-

ration. Before you had a chance to pat yourself on the back for a job well done, your vendors and industry analysts began tagging your network with that "legacy" label and warning of an impending need for even greater bandwidth than your relatively new network was capable of supporting.

This need brought with it an



onslaught of new technologies and products. (How convenient for the vendors; it makes you wonder which came first — the need or the products.) By late 1995, the networking landscape was beginning to look pretty confusing. Technologies such as switched Ethernet, 100Base-T, 100VG-AnyLAN, Copper Distributed Data Interface (CDDI) and ATM were being offered as alternatives to satiate our impending appetite for bandwidth, but it wasn't clear which would survive and which would fall by the wayside.

Some vendors became almost obsessed with the notion of latency and began to suggest networks should be flattened and switched, with routing pushed to the wide-area edges.

If you were fortunate — as State Street and probably most companies were — your network traffic load was not as heavy as the experts implied and you could afford to wait for some industry shakeout.

But now, traffic levels are becoming legitimate concerns, and it's time to take action. In fact, it's time to rebuild the network. Although some things have become clearer — such as the irrelevance of CDDI and 100VG-AnyLAN — many aspects of next-generation networks are less clear than ever, particularly in the area of switching vs. routing. So what should you do?

The bandwidth drivers

First, you should understand what is driving your need for greater network capacity. The causes generally are application usage or the repositioning of network resources. The majority of your issues can likely be traced to some combination of the

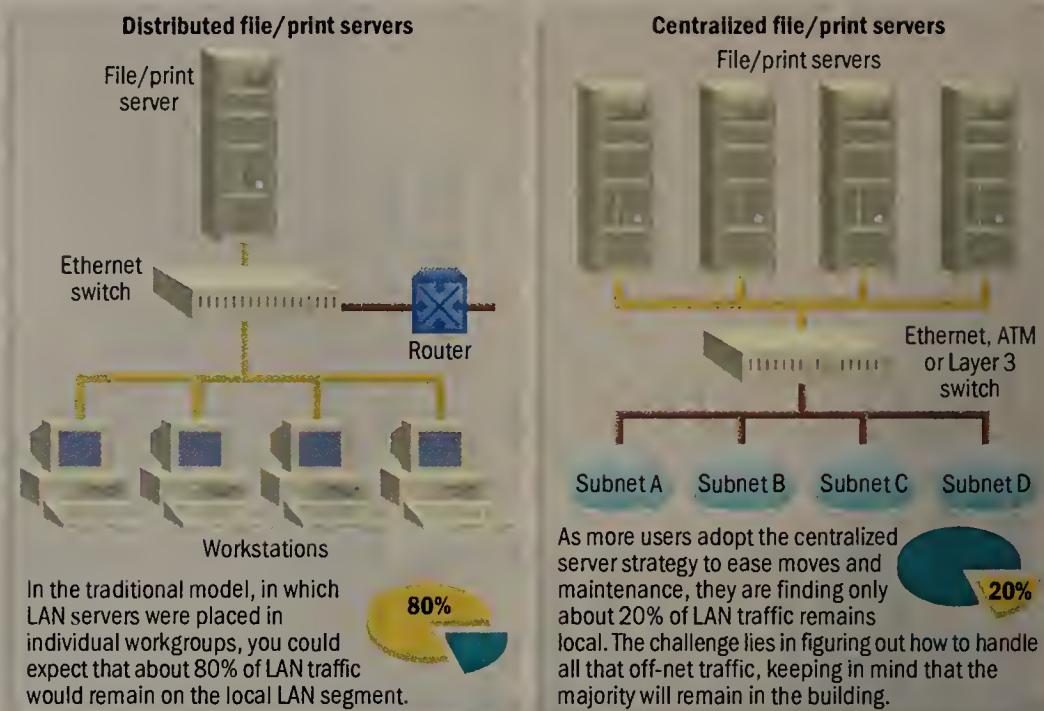
following:

- A shift in core business applications from the terminal/host model to the client/server model.
- The continuing use of computer technology to automate core business functions, including implementations of production workflow systems. These systems are becoming an increasingly important way for businesses to gain operational efficiencies and produce a return on investment in computer technology.
- An explosion in the corporate use of E-mail — internally among employees and externally to customers and business partners.
- The increasing use of groupware and office automation tools to share information and coordinate work.
- The creative use of Web technology for everything from information distribution to core business activity.
- A move toward fewer, larger, more-centralized servers for file, print and other applications, as companies continue to bring the once highly decentralized LAN environment under central IS management.

Notice that most of those issues have something in common: They tend to produce relatively greater percentages of non-local than local traffic. Nonlocal refers to traffic that leaves what was traditionally considered the users' local LAN segment, which is often equivalent to their local TCP/IP subnet.

When you built a network four to eight years ago, you could figure on perhaps 80% of traffic staying on a given LAN segment. This was because, in those days, many LANs were still being used for relatively noncrit-

THE 80/20 RULE HAS BEEN TURNED ON ITS HEAD



ical office automation applications, such as word processing and spreadsheets.

Typically, each LAN segment had its own file/print server, and the traffic on the LAN consisted mostly of clients loading application executables and files from the local server and printing via the server. The core mission-critical applications were still carried primarily on parallel terminal-to-host networks, such as SNA nets. Essentially, all traffic on the terminal-to-host network was nonlocal, if you think of it in terms of today's networks.

Traffic to and from file and print servers is of particular interest because it can have a profound impact on network traffic patterns, often accounting for more than 50% of all traffic. LAN administrators increasingly want to move toward centralized file and print servers in order to minimize the work involved with personnel moves. If the servers are on distributed local LAN segments, as is still common today, the LAN administrator has to move an individual's identification information and files from one server to another when the employee moves to a different LAN segment. If this is not done, user-to-server traffic will cross a router. If enough of this traffic starts crossing your first-generation backbone routers, the routers will begin dropping packets and you will have performance problems.

Because most personnel moves occur within a building, LAN administrators would prefer to move toward fewer, larger file and print servers, centralized in the building core. And LAN administrators prefer that the network be agnostic with regard to the segment or subnet on which users and servers are located. This would mean an administrator would need only change a network address (in the case of TCP/IP) when a person moves, a major labor savings compared to the old environment.

If the network addressing within the

building has been flattened or an extensive buildingwide virtual LAN scheme has been implemented, even address changes and server centralization would be unnecessary. This is the argument most often made by advocates of VLAN or virtual network technologies, although the TCP/IP address change issue is often exaggerated while the server data file and ID move issue is rarely mentioned.

To route or not to route

So what does this mean to those of us building next-generation networks? The critical point to keep in mind is that instead of assuming 80% of your LAN traffic will stay local, assume 80% will go off-segment.

But consider also that a large percentage of the off-segment traffic will stay within the building, particularly traffic to and from file and print servers centralized in the computer room.

If you have aligned TCP/IP subnets and Novell, Inc. networks with Ethernet or token-ring segments, then going off-segment means going through a router.

You can avoid the router if you flatten your network addressing or implement a fancy VLAN scheme. But should you?

Think about why you implemented routing in the first place.

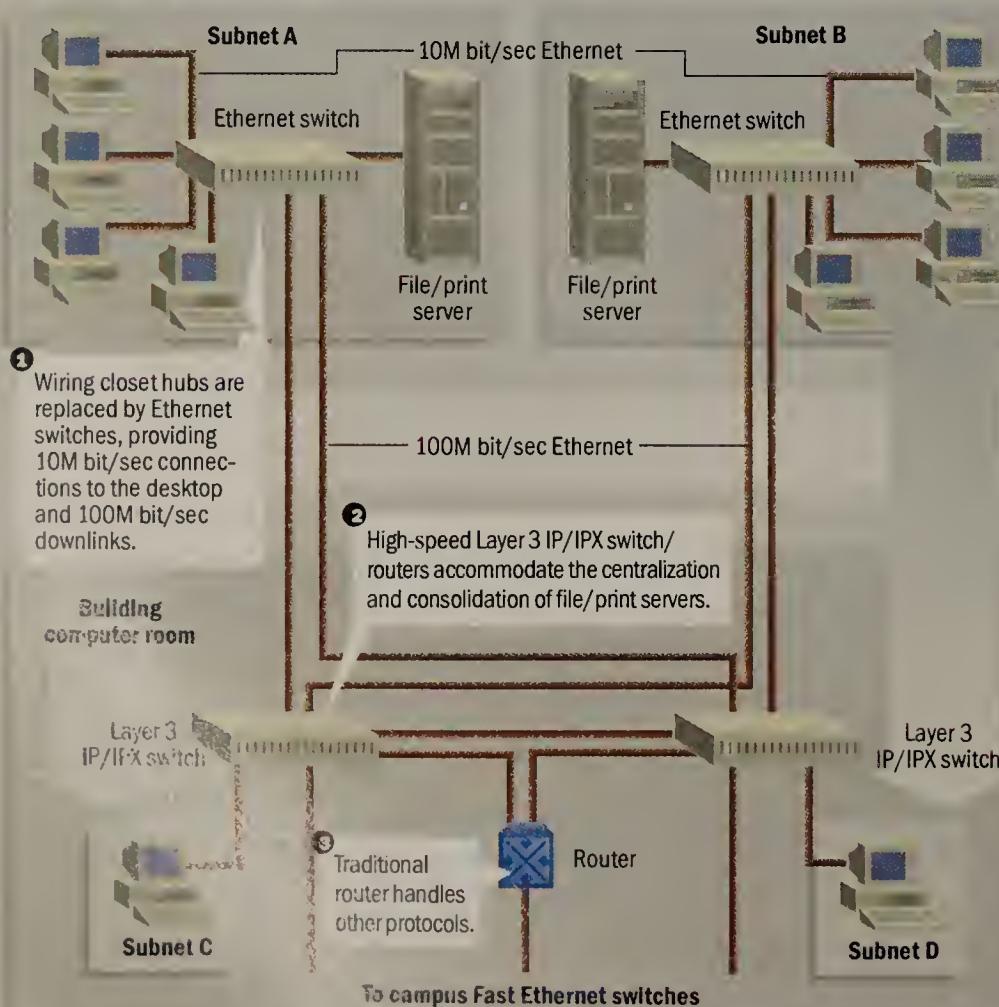
Many people did it to eliminate spanning tree and broadcast storm problems from their large, flat, bridged

networks. If you were in networking in those days — the late '80s — you probably had some experience with bridging loops bringing down your entire network.

This characteristic of flat, bridged networks became a major selling point for companies such as Cisco Systems, Inc. and Wellfleet Communications, Inc. (now Bay Networks, Inc.) in the early '90s. These vendors told us about the value of breaking our networks into smaller subnets and letting their routers interconnect the subnets,

ETHERNET-BASED BUILDING BACKBONE

User floor with two wiring closets



In mission-critical networks . . . uptime and reliability are paramount. Subnetting and routing provide the kind of reliability that is required; they are not to be readily abandoned.

keeping network problems contained within a subnet.

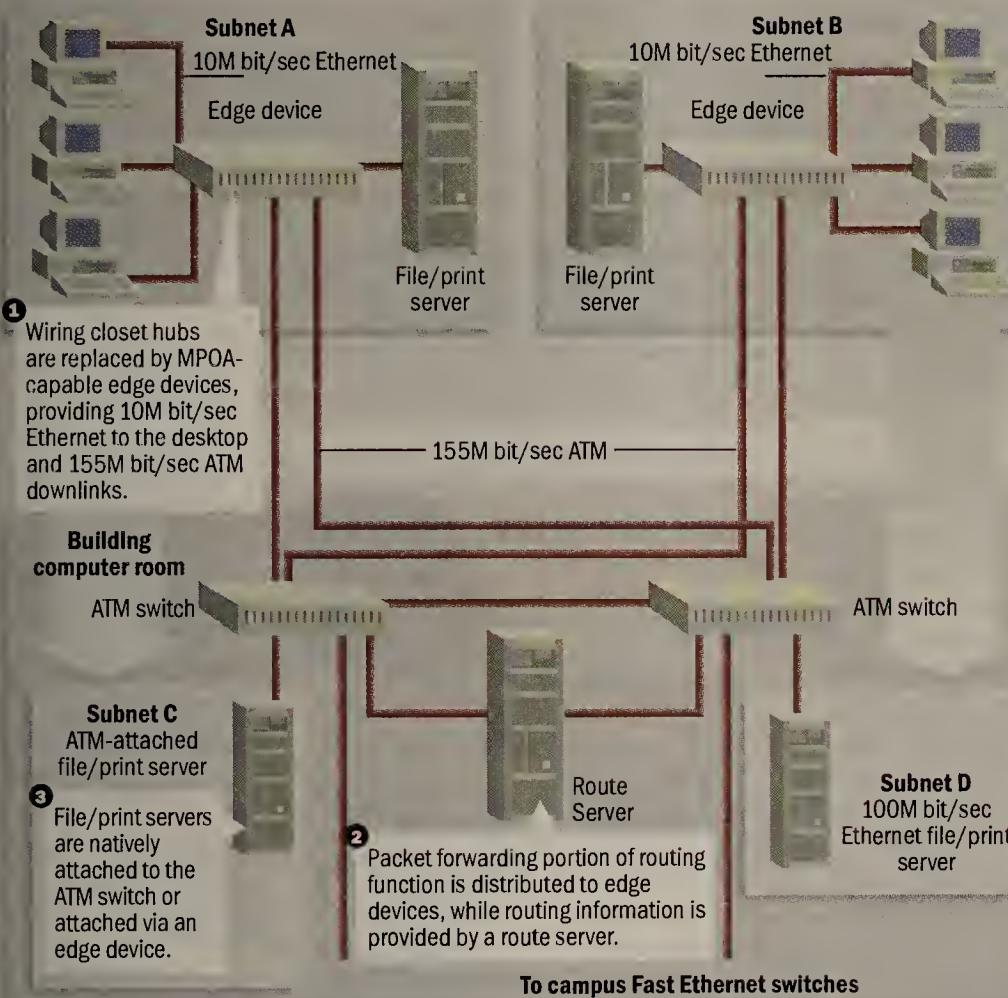
The truth is, they were right, and that's a major reason why they became huge success stories.

In mission-critical networks such as those in the financial industry, performance is always important, but uptime and reliability are paramount. Subnetting and routing provide the kind of reliability that is required; they are not to be readily abandoned. Flattening the network address space in an entire building or across a campus (as some vendors propose) so that traffic can be switched vs. routed is a frightening thought.

VLAN schemes solve some problems by

ATM/MPOA-BASED BUILDING BACKBONE

User floor with two wiring closets



grouping users into broadcast domains, but they generally use bridging and spanning trees to extend these domains — segments or subnets — across multiple network devices and locations. This seems too much like the same basic technology that gave us trouble back in the late '80s.

It also seems that when used as advertised, these schemes would allow subnets to spread randomly across multiple switches and locations in order to avoid having to change TCP/IP addresses at endstations. And as such, they could quickly create an environment much more difficult to administer and troubleshoot than what we're used to.

ATM, on the other hand, is too unlike the basic technology we've been using in the '90s to trust as the basis for a large, flat, switched network, at least until it has proven itself in a number of mission-critical environments.

Few people on the vendor or user side

have experience designing, building and, most importantly, troubleshooting large corporate ATM networks.

If ATM is to be used in a highly subnetted environment, the positioning and performance of Layer 3 functionality will need to be more clearly defined and understood.

Gigabit Ethernet also poses a significant threat to ATM's future within building and campus networks. There's a lot to be said for the "keep it simple" principle, and sticking with Ethernet within your buildings and campus does just that.

So what do you do if you want to maintain the reliability of your subnetted, routed network but also accommodate the move to large, centralized building and campus

WAN scaling issues than on the building and campus issues that are the focus of this discussion.)

Most of these approaches are proprietary in some way and fairly intrusive. In return for their advertised benefits, they generally ask you to do something you'd rather not do, such as the following:

- Run the vendor's proprietary software or protocols on many or all network devices
- Run proprietary drivers or client software at endstations
- Flatten your network addressing scheme
- Implement additional network gateway or server devices
- Run ATM

The bad news is these vendor strategies are not particularly consistent or compatible with each other. Not only is no consensus forming, new schemes seem to be appearing every quarter. What a colossal mess!

The good news is a lot of creative energy is going into developing Layer 3 switching and fast routing technology, and sooner or later, somebody will get it right. Cisco and some start-ups are doing some interesting work with gigabit routers. Although this work is initially targeted more at the Internet, the technological advances eventually should filter down to corporate customers.

The recently announced Switch Node

from Bay is targeted more at corporate networks and is said to be capable of acting like a wire-speed, low-latency (less than 50 microsec) Layer 3 switch that can scale to more than 1 million packet/sec.

Offering an interesting feature called IP AutoLearn, Bay claims IP switching can be implemented without any configuration changes to network routers, switches or endstations. The company also plans to price Switch Node more like a switch than a router. It is scheduled to ship this month, so time will tell.

A characteristic of corporate networks that Bay is taking advantage of with Switch Node is the fact that intrabuilding — and to some degree, campus routing — requirements are more straightforward than generic backbone requirements. In particular, intrabuilding traffic tends to be primarily IP and IPX with minimal requirements for advanced features such as filtering and prioritization. These features most often are used in the wide area, where security and bandwidth considerations are more significant.

In addition, much intrabuilding traffic is conducted among workstations and file and print servers. When these servers are centralized in a computer room, this traffic typically passes through only one or two routers. Therefore, schemes focused on

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improving performance in multihop scenarios do not apply here.

These relatively simple routing requirements should allow vendors to eliminate a lot of the protocol and advanced feature functionality that makes up most of a traditional router's software. Instead, they can focus on very fast and simple IP and IPX Layer 3 forwarding.

Through the risers, to the desktop

If you have a device capable of high-performance Layer 3 and Layer 2 switching in your computer room, the rest of the building design becomes rather easy.

Let's start at the desktop. Most customers and vendors can now agree that ATM is unlikely to make it to the desktop, at least in the next five years, so that allows us to focus on Ethernet.

Dedicated switched 10M bit/sec Ethernet to every desktop is a good solution for at least the next five years.

With the prices of switched Ethernet now coming close to what we used to pay for shared Ethernet ports, the savings to be had by using a microsegmentation approach—using multiple shared segments per switch card—aren't worth it in the long run. And 100M bit/sec Ethernet to the desktop is overkill for the vast majority of corporate America.

With video compression techniques, even television-quality video is unlikely to consume more than about 400K bit/sec per conversation, so a dedicated 10M bit/sec pipe to each desktop should do fine.

If you have good Layer 3 switching functionality in the building core, you can use a generic switch in the distribution closet.

Look for the same features you always looked for in a hub—high reliability, no single point of failure within the box and so on—with the added requirement of port mirroring to support protocol analysis equipment.

In the riser system, you need to decide between ATM and Fast Ethernet. The obvious choice for believers in the keep-it-simple approach is Fast Ethernet, and that's certainly a viable option.

However, you should also be positioned for the long term, so make sure your vendors of core and distribution closet equipment are committed to supporting ATM and Gigabit Ethernet uplinks in the future.

What would be useful here is an industry-standard way of grouping 100M bit/sec Ethernet uplink ports, so you could effectively build riser links of 200M, 300M bit/sec and so on.

This is being done today. In fact, Cabletron has a couple of ways of doing

it, but no industry standard allows you to mix equipment from multiple vendors.

Campus and beyond

So now you have 10M bit/sec Ethernet switches in your wiring closets connected to a new Layer 3 switch in your building core. What next?

If you have a number of buildings in a campus environment and have been able to run your own fiber among buildings, you should consider some sort of redundant switching fabric that feeds directly into the Layer 3 switches in the buildings or into more traditional routers that front the Layer 3 switches.

The need for traditional routers here depends on your protocol requirements and the specifics of the Layer 3 switch capabilities.

For the campus switch, you will again need to decide between ATM or Fast Ethernet.

Go with Fast Ethernet for simplicity's sake, as long as there is a path to ATM or Gigabit Ethernet in the future.

In the next two years, it will become much clearer which of the two is the market winner, and you can easily retrofit your network at that time if you need more bandwidth.

Beyond the campus, you get into WANs, which have too many variables to get into in the context of this discussion.

Suffice it to say that, in general, corporate WANs are largely influenced by economics and, therefore, you tend to install whatever the carriers price most attractively.

Most corporate WANs currently migrate from leased lines to frame relay largely for economic reasons.

If carriers decide they want you to move to ATM services and they price the services accordingly, customers will migrate—eventually—to ATM in herd fashion.

Most corporate customers don't have the scaling issues of Internet service providers, so some of the new WAN-oriented Layer 3 switching techniques may not be as critical to you as they are to the ISPs.

An interesting phenomenon in corporate WANs is virtual private networking. If security techniques get worked out, you may see more corporations turning large portions of their WANs over to "managed Internet" providers.

In the meantime, confusion in the industry is at record levels, so it's important to stay focused on your requirements and what you are trying to accomplish. Best of luck.

Stenson, now CEO of M5 Systems, Inc. in Braintree, Mass., can be reached at tstenson@m5sys.com.

NetworkWorld PC WORLD

SERVER TEST SERIES

A monthly feature in which we evaluate file and application servers based on tests conducted in a lab owned jointly with our sister publication, PC World.

An odd couple

By William Rinko-Gay

This month's enterprise servers have little in common.

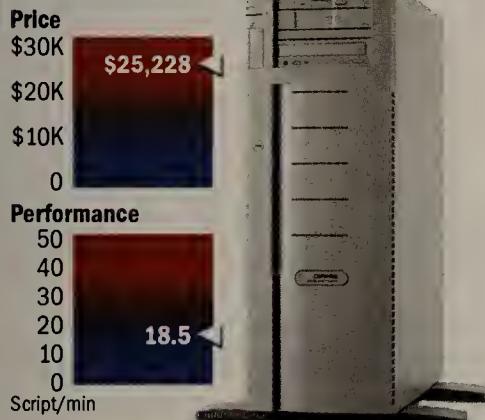
Compaq Computer Corp.'s ProLiant 5000 is full of vendor-specific hardware, while Data General Corp.'s Aviion 3600 is a collection of mostly OEM equipment.

Compaq provides its SmartStart and Insight Manager applications to ease installation and administration of the server. Data General focuses on reliability with its NT/Alert software and bundles Hewlett-Packard Co.'s HP OpenView and Symantec Corp.'s pcAnywhere32. They do share one trait — compared to our last batch of enterprise servers (NW, Feb. 24, page 46), this month's candidates are sluggish performers.

Nonetheless, the ProLiant server takes the top spot in our ratings, so far this year, thanks in large part to its integrated features and management applications.

ProLiant 5000

Vendor: Compaq Computer Corp.
Contact: (800) 345-1518
www.compaq.com/productinfo/systems/spd/p/5000/index.html



Performance ratings are based on the results of file server, database and Web server tests at the 32-client level. For these enterprise servers, results are weighted according to the following percentages for each test:

File server 30%
Web server 60%
Database 10%

Of the four enterprise servers we have reviewed this year, Compaq Computer Corp.'s ProLiant 5000 was first in our NetWare Web server tests, second in the NetWare file and database server tests, and third in the NT file and database server tests.

The performance of this ProLiant server is better than a previous

ProLiant 5000 we looked at last August, which reflects improvements in the server's components. Compaq uses its own network adapters and array controllers. This could be a performance disadvantage because the company cannot be as focused on these subsystems as OEM vendors such as Adaptec, Inc. and American Megatrends, Inc., whose entire business is network adapters and array controllers.

Compaq's use of its own adapters and controllers is a feature advantage, however, because their Intelligent Manageability can take full advantage of the adapters. Compaq even provides a failure warranty to keep your server up and running.

Our Compaq ProLiant 5000 came with the ProLiant Storage System. The twin towers — also available in a rack-mounted version to conserve space — take advantage of Compaq's Smart-2 controller with a write cache and battery backup for high reliability, expandability and performance.

The processor unit is a full-size tower, belying the lack of drive space inside. The locking front bezel opens easily, revealing hot-pluggable drive bays and a removable side panel. Inside is a full — but not cluttered — chassis.

The area beneath the drive bays is reserved for a fan that ventilates the

processors and components, while another fan over the drive bays keeps them cool. The 521-watt power supply is mounted on top, with room for an optional redundant power supply below.

Two cards to hold DIMMs, two cards to hold processors and expansion slots take up the remaining space. In our test configuration, which required four net adapters, three expansion slots were available.

A SCSI cable connects the ProLiant to the Storage System, which is a much smaller tower that can hold as many as seven drives for a total of 30G bytes of storage. The locking front bezel swings open to reveal the hot-pluggable drives, which have a solid connection mecha-

nism. In the back, the power supply, optional redundant power supply, controller board and cooling fans all can be removed without the use of tools.

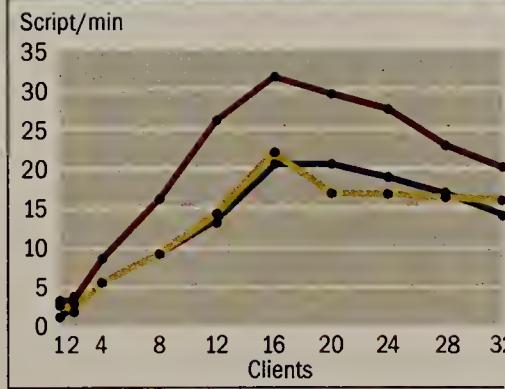
Compaq supplies SmartStart to make it easy to install the network operating system with the proper drivers and agents. SmartStart also loads support software such as Oracle7 Server and Netscape Server.

You can configure the ProLiant as a stand-alone server or use a configuration server on the net to ensure common installations. SmartStart installs Compaq's Insight Manager, a graphical fault- and performance-management package. Compaq supplies full documentation on CD-ROM and a reasonable set of printed documentation.

PERFORMANCE SUMMARY

We measure performance from the client's point of view and report the time it takes to complete typical tasks. Our performance summary graphs show the results of each test in scripts per minute, with the number of clients ranging from one to 32. Because the tests run faster than a real client could perform the operations, each of our test clients stresses the servers as much as several real users would.

Data General Corp. Aviion 3600

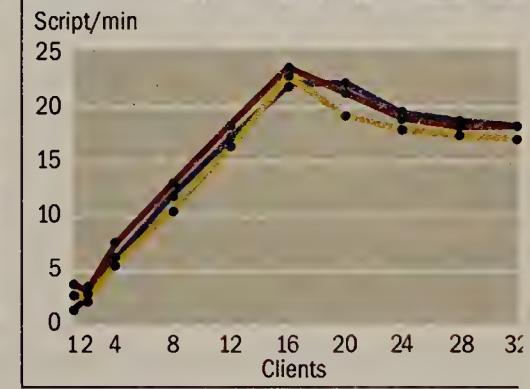


FILE SERVER Our file server tests run scripts on ascending numbers of clients for four applications: Microsoft Word and Excel for Windows, Lotus 1-2-3 for Windows and Corel WordPerfect for Windows. The scripts perform file access operations such as opening, importing and saving files.

DATABASE Our client/server database test uses Microsoft Access on the front end and Oracle Server 7.3 on the back end. We perform various read and write operations on a three-table payroll management application.

WEB SERVER Our Web server test uses Netscape Enterprise Server 2.0 under Windows NT and Novell Web Server 2.51 under NetWare. We view pages containing text and graphics and use Open Text's Livelink Search 7.0 to search a 1G-byte document database.

Compaq Computer Corp. ProLiant 5000



NetworkWorld PC WORLD

SERVER TEST SERIES



If Data General Corp. (DG) has any visions of its Avion 3600 server paving the way to market leadership, it had better readjust its focus. Under Windows NT, the Avion 3600 came in last or nearly last in all our tests. The only place it ranked near the top was in price, with an estimated street price of \$31,663.

Data General Corp. **Avion 3600**

OVERALL SCORE	7
Performance (30%)	6
Features and flexibility (30%)	8
Management apps/features (20%)	7
Serviceability (20%)	7

Scores are based on a scale of 1-10. Percentages are the weight given to each category in determining the overall score.

The server's poor performance may be due to the IBM disk drives, which we haven't seen before or perhaps the remote diagnostic card using backplane bandwidth.

At DG's request, we didn't test the server under IntranetWare because it is sold only as an NT server.

DG seems to be focused on reliability. The Avion 3600 is assembled almost

entirely from components made by other vendors. DG has a remote diagnostic card that can monitor the system and allow you to troubleshoot problems via modem even if the computer is powered off.

The Clariion external storage system has dual redundant channels to the RAID system for nearly 100% availability. NT/Alert can page you or a DG service representative when any alarm condition is met. Add all this to the HP OpenView support and the copy of pcAnywhere32 that is shipped with the system and the focus becomes clear.

Looking at the front panel of the Avion 3600's tower, you'll find two lockable doors on the left that enclose the standard and hot-pluggable drive bays. On the right are LEDs that indicate power, disk I/O activity and alert status. A rack containing six drives is behind the hot-pluggable drive door, which is behind an additional locking panel. The drives are held in place by a solid locking mechanism.

Two side panels also swing out, but with a bit of difficulty. The left side of the unit contains the logic boards. Of the many EISA and PCI slots, most of the PCI slots were used. An integrated video adapter would free up a valuable PCI slot.

One of the EISA slots was occupied by DG's ExTended service board for remote diagnostics. This board — which features a battery backup — can be accessed to diagnose problems even when the server is shut down.

The CPUs are easily accessible, but the SIMMs are hard to reach and require the removal of a bracket and a card.

The right side of the chassis is nearly empty. It provides access to the drive bay area and houses the electronics for remotely powering the system. Some of the spare space is available for an optional redundant power supply.

DG preinstalled NT/Alert software, which watches for alarm conditions you specify, such as the file system being 90% full or network errors exceeding a threshold. It can be programmed to send a network message, make a phone call or page an operator.

THE LEADER BOARD — ENTERPRISE SERVERS

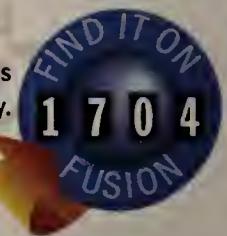
Model	Issue tested	Performance rating	Overall score
Compaq ProLiant 5000	This issue	18.5	7.7
HP NetServer LX Pro 6/166 SMP	2/24/97	20.4	7.5
Data General Avion 3600	2/24/97	18.0	7.0
SAG STF Quad RAID 5	This issue	24.2	7.0

DG's rebranded system manual is far more detailed and easy to use than previous DG documentation. We received OEM manuals for the network adapters, NT and DOS. Copies of pcAnywhere32 Version 7.5 and QAPLus/Pro from DG also were provided.

This server is no price/performance bargain. But its reliability features are outstanding, and the service and support provided are a real benefit to com-

panies that don't have the expertise or time to maintain their own servers. However, unless those conditions apply to you, it's hard to justify the cost of this server. ■

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ENTERPRISE SERVERS: THE INSIDE STORY

Data General Corp.		Compaq Computer Corp.	
Model	Avion 3600	ProLiant 5000	Quad 200-MHz Pentium Pro with 512K-byte Level 2 cache
Processor	Quad 200-MHz Pentium Pro with 512K-byte Level 2 cache	Processor	Quad 200-MHz Pentium Pro with 512K-byte Level 2 cache
Max. processors	Quad 200-MHz Pentium Pro with 512K-byte Level 2 cache	As tested	Maximum
Memory	256M bytes	256M bytes	4G bytes
Slots	Provided	Open	Open
EISA	7	4	1
ISA	0	0	0
Shared	1	0	2
PCI	7	2	5
Processor	0	0	2
Bays	Provided	Open	Provided
Internal	0	0	3
External	6	4	0
Hot-plug	6	0	4
Storage			
Adapter	AMI MegaRAID with 32M bytes cache	Compaq SMART-2 Array Controller	Fast Wide SCSI-2
Bus	Ultra Wide SCSI-2	14.7G bytes	Seagate Barracuda ST32550W
Capacity	24.6G bytes	Internal	External
Model	IBM DCHS046Y	24G bytes	2.9T bytes
Maximum drive capacity	Internal	External	Internal
	Toshiba XM-5401TA 4x SCSI		34.6G bytes
CD-ROM	Digital EtherWorks Fast PCI		>700G bytes
Network adapter			Sanyo CRD-254V 4x SCSI
	ECC RAM, Multipath I/O, BIOS extended diagnostics suite, hot-swappable, RAID 5 capable (tested at RAID 0), hot spare, online rebuilding		Four Compaq NetFlex-3P with 100Base-TX UTP module
Fault tolerance features			ECC RAM, RAID 0, 1, 4, 5, Options: redundant power supply, redundant network adapters, redundant processor power module
Security features			MultiLock security features, BIOS passwords, diskette drive control, diskette boot control, network server mode, parallel and serial interface control, disk configuration lock
Bundled software			Compaq Insight Manager, SmartStart
Warranty, support and misc.			Toll-free 7x24, three-year on-site warranty, prefailure warranty on drives, CPU, memory and power supply, optional four-hour response; Compaq ProLiant Storage System

ChatCom Application Consolidated Servers



Consolidation

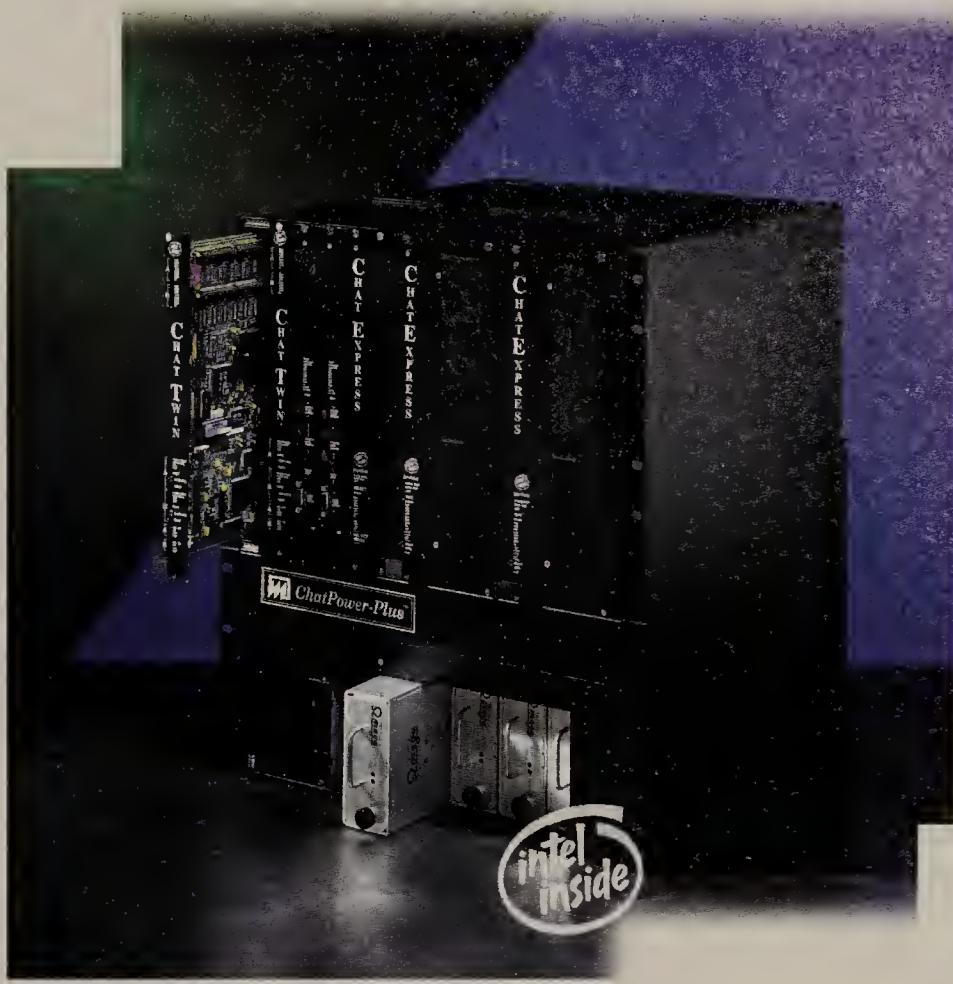
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Covering: Budgeting, Staffing and Career Planning

Briefs

Teletutor, a telecommunications and data communications training company in Portsmouth, N.H., has upgraded its **computer-based training course** covering LANs. The company has added the Interactive Course Map for navigation and tracking as well as a notes and tagging feature that enables administrators, managers and students to route comments about selected course information.

The single-user version costs \$895. The annual cost for 10 users is \$1,795.

Site licenses are also available.

& Teletutor: (800) 542-2242

Web job resource SuperSite.net and Computer Currents Interactive have teamed to offer **employment services** for IS professionals. The Computer Currents Interactive job bank, managed by SuperSite, is at www.currents.net.

SuperSite has similar cross-link agreements with Macworld Online (www.macworld.com) and the IEEE (www.ieee.org).

Hot Jobs sections at each site provide visitors with job listings most relevant to the technology areas that are discussed there.

& SuperSite: (408) 343-0300

NETWORK BOOK REPORT

Intranet as Groupware

Mellanie Hills (New York, Wiley Computer Publishing) 308 pp., \$29.95. Phone: (800) 225-5945; ISBN: 0-471-16373-2.

Hills argues that the advent of cheap and easy-to-construct intranets that include E-mail, newsgroups and mail lists has paved the way for groupware. Her book is a study on how to select and implement intranet groupware for better communication, coordination and collaboration in the workplace. It is written for IT managers, systems analysts, network administrators, Webmasters and Web developers. Among the companies contributing their experiences with groupware implementation are J.C. Penney Company, Inc., AT&T, EDS Corp., Texas Instruments, Inc.

Go to Network World Fusion for more information about these books.

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and Turner Broadcasting System, Inc.

Windows NT Server 4: No Experience Required

Robert Cowart and Boyd Waters (Alameda, Calif., Sybex) 488 pp., \$29.99. Phone: (510) 523-8233; ISBN: 0-7821-2081-4.

This book assumes you know what you're doing when it comes to PC operating systems. It jumps right into the nuts and bolts of NT Server and explains what's new.

You'll get advice on network hardware and topology choices and tackle installation and implementation issues, including network bottlenecks and security. Tips on developing distributed client/server and intranet systems will round out your education.

are all equally important to creating that service, and project management is how we bring those things together."

The key is to strike a balance, says Steve Tavan, who for 10 years has been involved with project management at The Mitre Corp.

"Headhunters today often seem to consider project man-

agement skills, but also an understanding of underlying technologies and the purpose of the project."

Acquiring project management skills seems to be a catch-22. The best—and perhaps only—way to learn them is by doing, which means managing projects. But who wants to give an unseasoned project manager the chance?

Even those involved in project management training don't seem to offer much help.

"Until you've managed a project, you're not ready for the kind of training I give," says Mel Schnapper, president of Mel Schnapper Associates, a human resources and consulting firm that specializes in organizational development and change management. "The potential project managers in my workshops don't get what the workshop has to offer if they don't have the experience."

"[Ideally], a company will sponsor someone to go to a two- to three-day workshop, let them manage a project or be an assistant if the team is big enough. Afterward, they send them to another workshop [and everything starts to sink in]," Schnapper says.

Schnapper hit on one good way to build project management skills—ask to help with a project that interests you. Even if you only manage a small part, it will be valuable experience. If you handle your piece successfully, it can win you more responsibility down the road.

But as you dive in, Schnapper warns, don't assume that learning to create charts or use project management software will be sufficient. "Most project management courses deal with things such as PERT, GANT and critical path charts but neglect the people aspects—interpersonal, managerial, teamwork stuff, career issues and corporate culture," he says.

Regardless of how you do it, acquiring a track record of successful project management can help you tackle new tasks and it will be a valuable addition to your resume.

David Wray, a project manager at BBN Planet in Cambridge, Mass., was one of the people responsible for rolling out the company's new Internet service offerings. In that role, he was involved in defining and overseeing activities including ordering, provisioning, technical support and vendor-carrier coordination.

"If people participate with you on a project and it's a fundamentally positive, successful experience, that's gold," he says.

Dern is an author, speaker and consultant who works with businesses and end users to develop Internet/intranet strategies. He can be reached at ddern@world.std.com.

Recruiter outtakes

"Regardless of what the individual is focused on, project management and project life-cycle skills are important," says John Wallin, president of Tech-KnowleDGE, an executive search firm that specializes in the information and technology industries. "If you're a senior person, you better know how to handle a project from soup to nuts—from a needs analysis and requirements analysis to analyzing the current situation and making a proposal."

"Managing a project can give you good experience in understanding your company from the top-level business perspective, as well as make you more highly visible," says Richard VanDoren, vice president at Manchester Partners International, an outplacement and career counseling firm in Iselin, N.J. "If you're going to rise to high levels in the company, you need to be a business person with a technological understanding. [Otherwise], you're more vulnerable to being replaced, outsourced or frozen at the level you're currently at."

—Daniel Dern

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- Ability to travel

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6/23/97	Extras: HARVEY STUDY; Review: Performance modeling/capacity planning software; Special Focus: Ipv6; Technology Update: Browser-based management	June 11th
6/30/97	Server Review Series; Special Focus: Meta-Directories; Technology Update: Gigabit Switching routers	June 18th

For more information or to place an advertisement, please call Pam Valentinas at 1-800-622-1108.

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Eight past weeks of Networking Careers can be found under Job listing.

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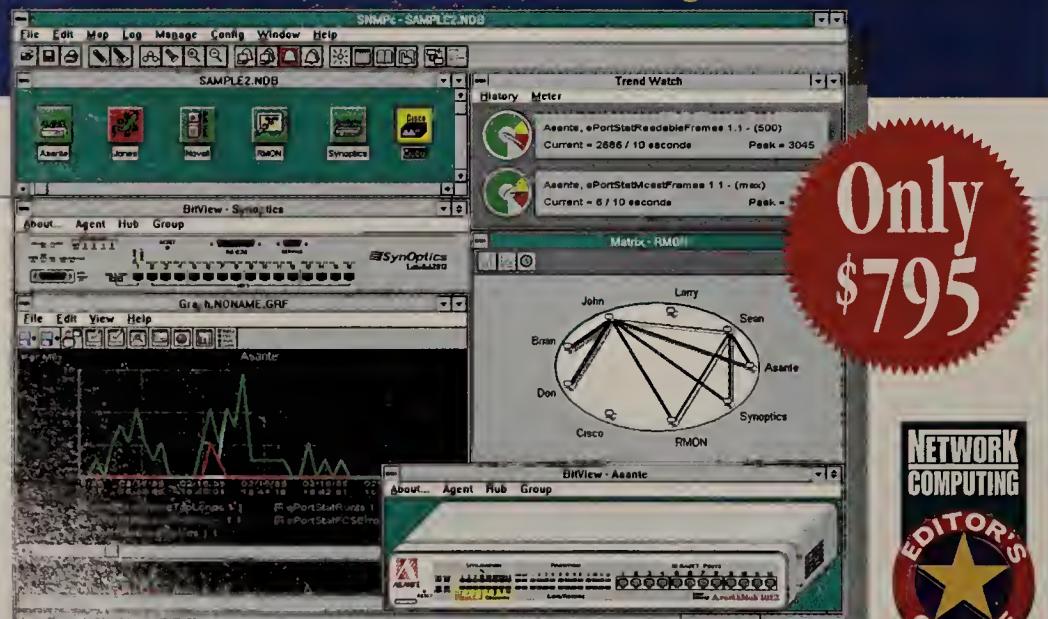
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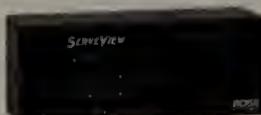
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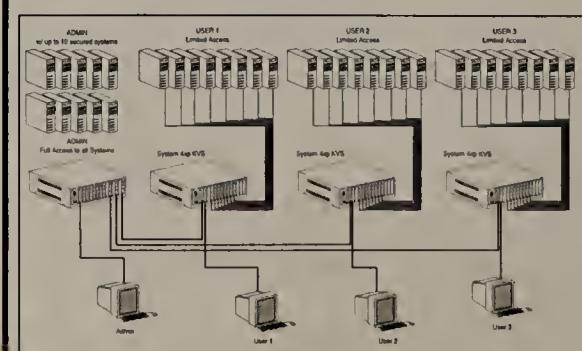


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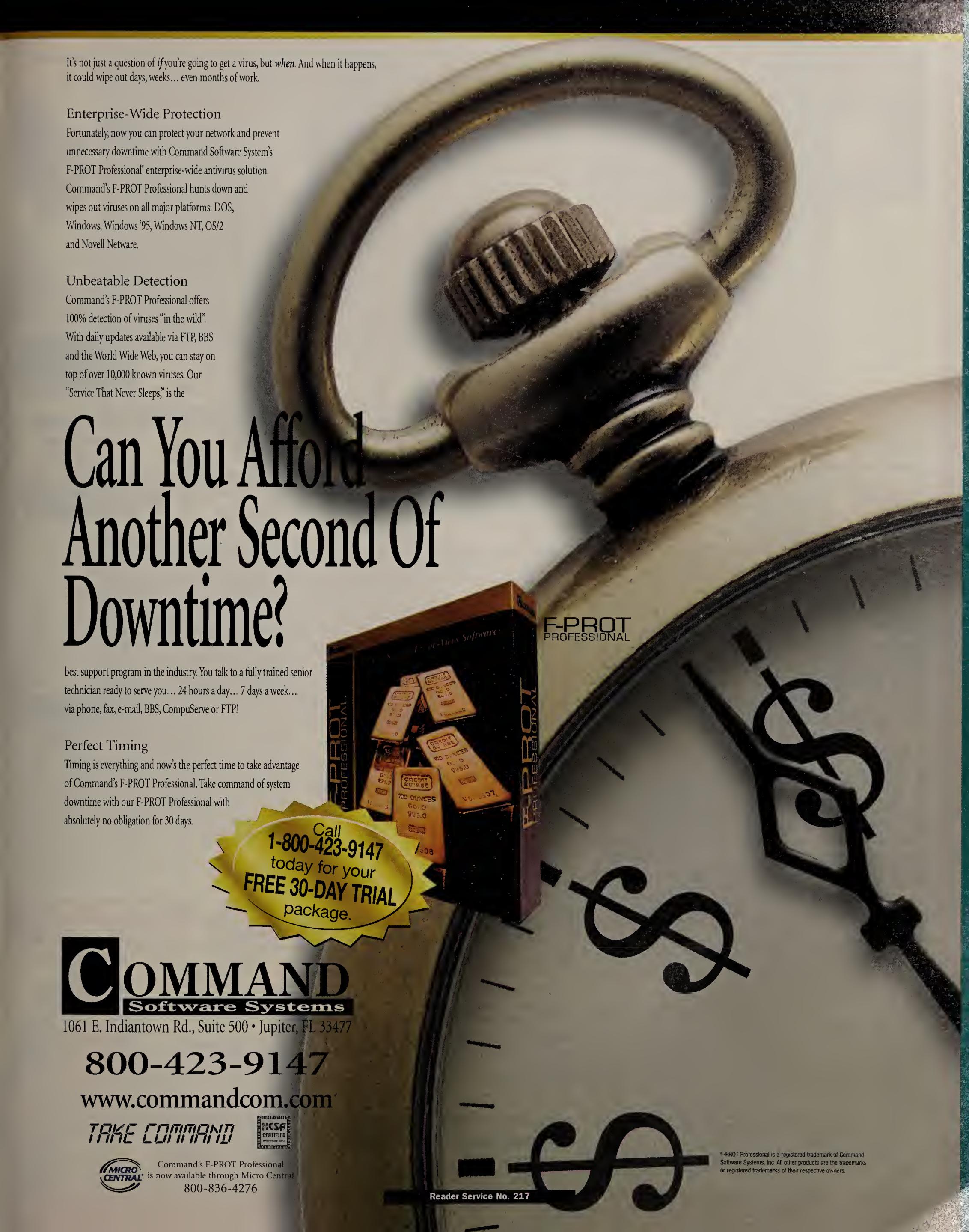
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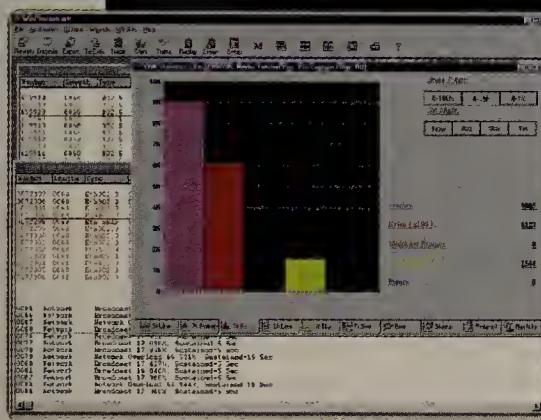
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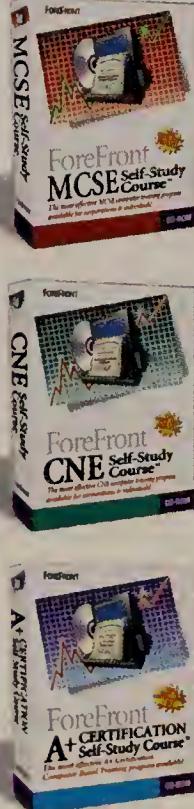
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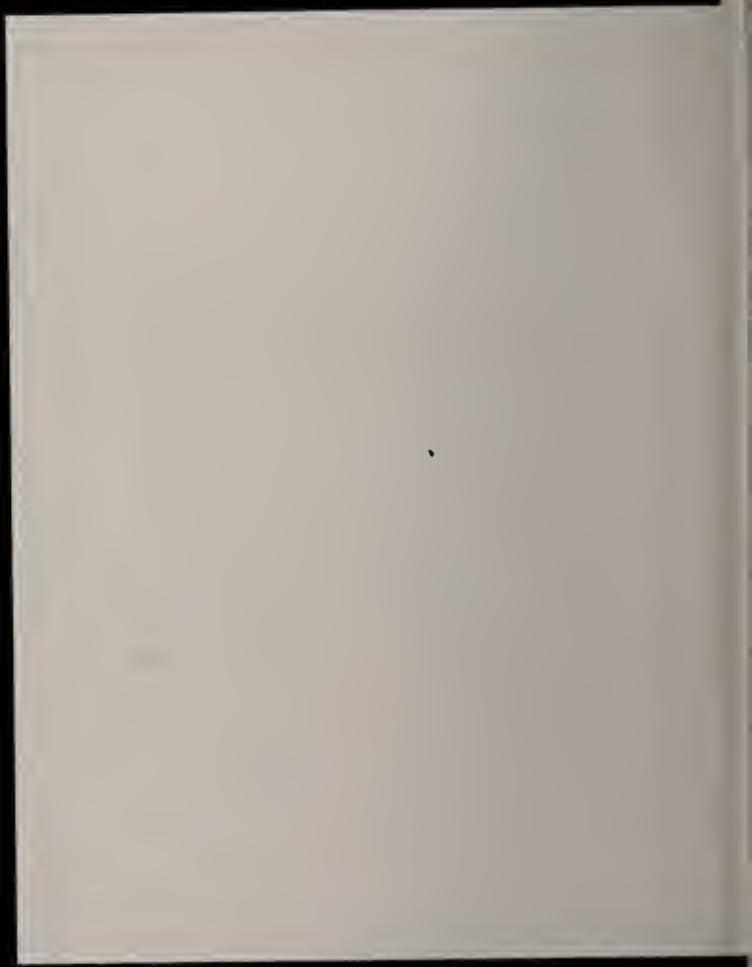
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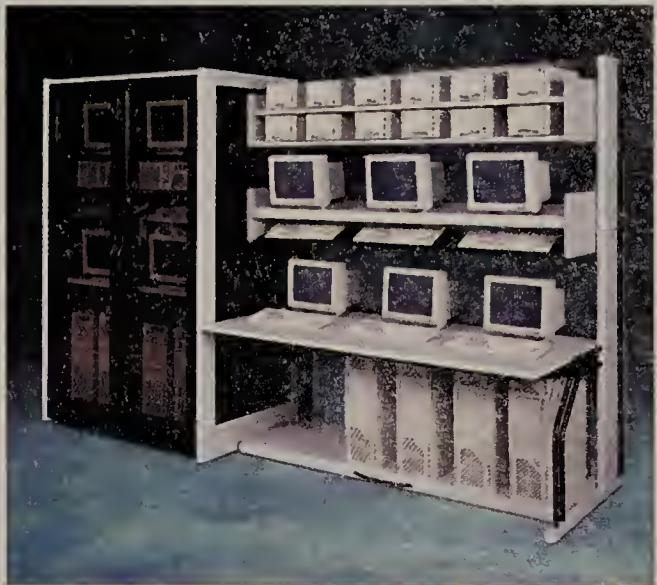
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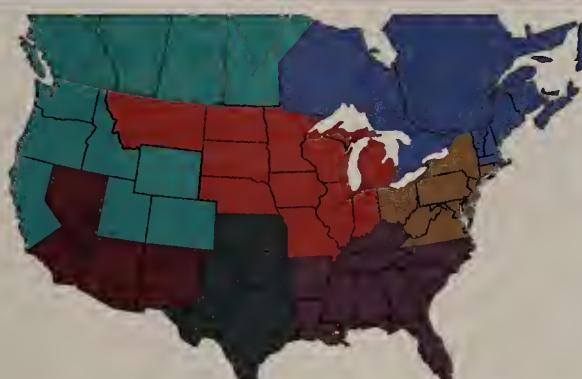
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Token Ring

Continued from page 1

All of this activity is welcome news to token-ring customers. Many of them feel they have been abandoned by the industry and left with little hope of migration to speeds beyond current 16M bit/sec links. Token ring has taken a beating with the ever-growing popularity of Ethernet, Fast Ethernet and Gigabit Ethernet. Even FDDI — often described as 100M bit/sec token ring — is a tough sell because it requires customers to tear out their copper cable in favor of expensive fiber.

"Lots of token-ring shops are starting to wonder if it's time to make the switch to Ethernet," said Tony Villani at Hingham Mutual Fire Insurance Co. in Hingham, Mass. Fast Token Ring at high speeds of 100M bit/sec "might be something to stem that."

Villani, who is using Cisco's token-ring switch, said he is hesitant to make the leap to ATM and would be interested in a high-speed token-ring alternative. "If something like 100M bit/sec token ring were to take a foothold, I'm sure we would migrate there before making the jump to fiber," he said. "If they could make 100M bit/sec token ring that would sit right in a switch with 4M and 16M bit/sec, that would be nice."

"There's a clear, obvious gap in token-ring technology today, where vendors expect customers to move from 16M bit/sec token ring to 155M bit/sec ATM," said Kevin Tolly, president and CEO of The Tolly Group, a testing and consulting firm in Manasquan, N.J. "Fast Token Ring could be just the catalyst needed to reverse the downward psychological spiral that many token-ring users are feeling."

Enter Cisco

"There are folks that need something in between [16M bit/sec token ring and 155M

bit/sec ATM] for backbone technologies that aren't ready for ATM," said Sue Sept, product manager at Cisco. "So we'll transport the entire token-ring frame over a Fast Ethernet pipe and allow you to have multiple VLANs across switches."

In fact, Cisco is already working with Olicom A/S to provide Fast Token Ring network interface cards (NIC). Olicom will add Cisco's ISL protocol to its PCI-based token-ring server NICs for release in the second half of the year, according to Steen Lohse, Olicom's vice president of corporate marketing. Olicom is also writing drivers for Microsoft Corp. and Novell, Inc. operating systems.

But Cisco may not be the first company to market with Fast Token Ring. 3Com Corp. claims it recognized the need for higher speed token-ring server links about six months ago. It is now offering a similar technology, called VLAN trunking, for carrying token-ring traffic between switches at 100M bit/sec.

VLAN trunking encapsulates token-ring frames within Fast Ethernet frames using a method the IEEE 802.1q committee approved only a few weeks ago. Also, 3Com has developed VLAN trunking drivers for its own Fast Ethernet NICs, according to Scott Lindsay, director of marketing at 3Com.

Not a new idea

This is not the first time the industry has heard about 100M bit/sec token ring. The idea was pitched by IBM more than six months ago to the Alliance for Strategic Token Ring Advancement and Leadership (ASTRAL), but was abandoned.

"Everybody decided not to do it. They figured they couldn't get [Fast Token Ring] done fast enough, it might cost too much and many token-ring users were migrating to Ethernet anyway," said Frank Hayes, senior program manager of LAN switching at Cabletron Systems, Inc., a par-

Bay, Madge bolster token-ring line

Switching rivals Bay Networks, Inc. and Madge Networks, Inc. separately are readying products designed to quench token-ring users' thirst for more throughput and prevent users from migrating to ATM.

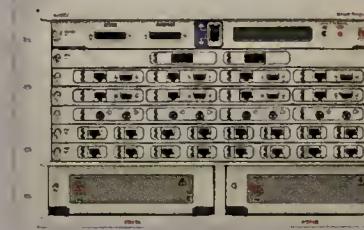
Bay this week will announce several token-ring switches and modules with increased port counts, while Madge next month is expected to roll out a high-density token-ring backbone switch.

Both companies also are introducing ATM LAN Emulation (LANE) software that will help customers port their token-ring applications to ATM networks. Vendors have decided to couple ATM with token ring because they see many users making the move to higher speed ATM because of their frustration with token ring's 16M bit/sec limit.

Bay's new offerings include the Centillion 50T, a 16-port fixed configuration 4M/16M bit/sec switch that sports an expansion slot for a high-speed uplink. The Centillion 50T is a scaled-down version of Bay's 24-port Centillion 100. It costs \$10,995.

Bay also will roll out eight-port TokenSpeed modules for its six-slot Centillion 100 switch. The modules cost between \$6,995 and \$8,995. Currently, TokenSpeed modules feature four ports.

And Bay's System 5000 network center switch will get its first taste of token-ring switching with



Madge's Smart RingSwitch Plus

eight-port modules that cost from \$8,995 to \$10,995. All the new switches and modules will ship in July.

The distributed LANE software, meanwhile, allows users to configure redundant ATM LANE servers, broadcast and unknown servers among Bay's token-ring switches and routers. ATM LANE servers resolve LAN-to-ATM addressing issues.

Bay rival Madge will unveil the Smart Ring-switch Plus, a six-slot chassis housing six-port token-ring switching modules.

The switch doubles the port density of Madge's three-slot Smart Ringswitch and adds a redundant power supply and optional ATM uplink.

Madge is also implementing prestandard LANE 2.0 software on its token-ring and Ethernet switches for distributed LANE services.

The Smart Ringswitch Plus will ship in August and cost \$27,400.

Despite efforts of vendors such as Bay and Madge to make token ring and ATM more attractive, some customers are making the wholesale change from token ring to Ethernet.

"We're exclusively token ring now, but are looking to migrate to Ethernet" because of lower per-port costs and richer feature sets, said Bay customer Eric Ferguson, senior LAN manager at Maryland Casualty Co. in Baltimore.

—Jim Duffy

ticipating member of ASTRAL.

In fact, about half of Cabletron's token-ring customers are embracing other technologies such as Ethernet, Fast Ethernet and ATM. One such customer, Chuck Benton, special projects team leader at Nevada Power Co. in Las Vegas, said that Fast Token Ring would not have interested him even before he swapped out his token-ring network for Ethernet last year.

"Speed isn't the only problem with token ring," Benton said. "We were tired of vendors telling us that they didn't have certain software products available for token ring and the pricing was too high, so we just wanted to become more mainstream."

But there are still a significant number of token-ring shops out there — many of which are conservative customers such as financial institutions — that are sticking with token ring.

"Vendors claim that they are responsive to the needs of the users... well, this is a real need," he said.

While Cisco and 3Com are the only vendors committed to offering 100M bit/sec token-ring gear, other top token-ring vendors have expressed an inter-

est in the technology.

"We realize that many of our customers are pretty conservative and don't want to move fast to new technologies like ATM," said Rick Moukperian, general manager of adapters, hubs and technology in IBM's Network Hardware Division in Raleigh, N.C.

IBM is currently evaluating the customer demand for a 100M bit/sec version of token ring, Moukperian said. If IBM does decide to develop 100M bit/sec token ring, the company would open the technology up to a standards body such as the IEEE.

If multiple vendors like Cisco and IBM pushed Fast Token Ring through a standards process, Madge Networks, Inc. also would pursue it, according to Jeff King, product line manager for ATM and token-ring products at Madge. But until then, Madge's primary message is that ATM is the correct technology to evolve to from token ring.

Bay Networks, Inc. is singing a similar ATM tune. "We believe the

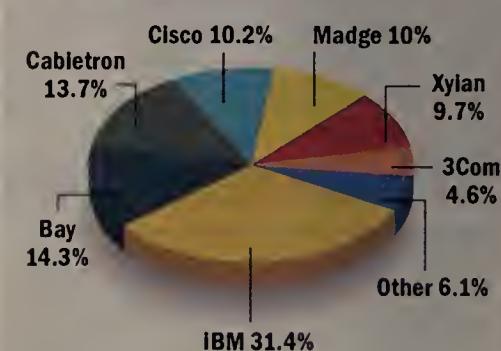
majority of large token-ring shops do accept ATM as their long-term backbone destiny," said Mark Cowtan, Centillion product marketing manager at Bay.

Although Cowtan did admit that Cisco, IBM and Madge getting into the Fast Token Ring market would probably force Bay to enter, as well. ■

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IBM STILL ON TOP

IBM maintained its solid market share lead in the worldwide token-ring switch market during the first quarter, but that lead could be in jeopardy if Cisco's new high-speed token-ring technology takes off.



*Based on 56,046 total ports shipped.

SOURCE: DELL'ORO GROUP, MENLO PARK, CALIF.

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Continued from page 1

The next few months will be a critical time for NCI in terms of finding out whether customers are skeptics or believers.

Despite the hype Ellison has whipped up around the NC concept, thin-client devices that run Java applets stored on servers are still largely unproven as less expensive, easier-to-manage alternatives to PCs running Windows.

Most NC hardware and software products won't ship in volume until the end of the year and relatively few robust Java applications are available. Even customers that have bought into the NC concept are typically only conducting small pilot projects.

"I'm frankly disappointed in NCI's progress," says one industry analyst who insisted on anonymity. "I would have liked to see more support from hardware and software application vendors."

But NCI is not standing still. The company just snapped up Netscape Communications Corp.'s Navio subsidiary, which is focused on consumer-oriented NCs and adds 80 people to NCI's

120-person workforce (see story, this page).

NCI also will announce shortly a licensing agreement involving software from a third-party vendor that lets NCs access server-based Windows applications. And in June, the company will formally demonstrate its client and server software as well as announce a slew of hardware and software partnerships.

By year-end, the low-key Baker says NCI hardware and software will ship in volume, and he plans to have a half-dozen corporate accounts, each deploying at least several hundred NCs.

Touching a nerve

While the NC has not come close yet to killing off Windows PCs, NCI clearly has touched a nerve at Microsoft. Chairman Bill Gates and company last fall announced the NetPC program, which is designed to create an easier way to manage PCs. More recently, Gates said Microsoft would create its own version of an NC, dubbed the Windows terminal.

"[NCI] showed that thin desktop clients with server-centric applications were a viable approach and could save a great

deal of money for certain types of users," says Dan Kusnetzky, an analyst with International Data Corp. in Framingham, Mass.

Under Baker, a trusted Ellison lieutenant who had directed some 1,000 programmers while with Oracle proper, NCI has midwifed a standard hardware and software description of the NC called the NC Reference Profile. NCI licensed the profile to a host of companies now building NCs.

Last month, NCI released a limited edition of its NC client and server software and also released office and desktop applications based on Oracle products.

"Any objective observer would have to give NCI considerable credit for developing, borrowing and buying technologies, and then gluing them together

and getting the result to market," said Peter Kastner, a vice president at Aberdeen Group, Inc., a Boston-based consultancy.

But both the promise of NCI and the problems facing the company are typified by the needs of its lone corporate customer to date, retail florist 1-800-FLOWERS in Westbury, N.Y.

For years, the florist has wanted to switch hundreds of call center order takers from terminals to PCs but found the cost of doing so was prohibitive, says Chris McCann, a vice president at the company.

After talking with Baker and the NCI technical staff, the florist tested early NCs in a pilot program. The plan now is to roll out the devices gradually to eight call centers and then to

hundreds of retail stores.

However, initially NCs will not be used for the Java and HTML programs they were designed to run. Rather, McCann says the devices will access existing Windows and Oracle applications.

For some observers, NCI is not so much creating the NC wave as riding it.

The company is exploiting Internet technologies that make thin-client computing possible and attractive, just as user frustration with Windows PCs is reaching a new high.

"If network computing does succeed, NCI has the chance to be a major player in making this new kind of device work in the commercial market," says Tom Austin, a vice president at Gartner Group, Inc. in Stamford, Conn. ■

What Baker is cookin' up at Network Computer, Inc.



Q&A The man guiding Oracle Corp.'s Network Computer, Inc. (NCI) subsidiary day-to-day is CEO Jerry Baker, who took the job a year ago at the behest of his boss, Oracle Chairman Larry Ellison. Baker recently shared his views on the network computing market with *Network World* Senior Editor John Cox.

Do you really believe the Wintel platform is a dinosaur?

I wouldn't include Intel with the dinosaurs. It's not the Intel platform [that's outdated], but the software that you install and have to manage. Wintel is just not a workable system for most people.

And what is?

A server-based model where you pull information from the server as you need it—applications, data, content and services. That's the model most appropriate for both the consumer and corporate environments.

There's a massive investment in Windows software. Surely people aren't going to scrap all that.

The same objection could have been made 20 years ago with the advent of the PC: There was a huge investment in IBM mainframes and software. But the PC offered such compelling benefits that a whole new model grew up around it. If you look at the investment being made right now in Java—and Java is far from perfect—the resources going into developing Java applications is incredible. And the applications all will run on the network computer (NC).

Are you going to make money with this?

Our goal is to generate revenue [through software sales], become profitable and eventually take the company public.

Are you profitable now?

We hope to be in 12 to 18 months. We are sell-

ing our software now but in very limited quantities for two reasons. One is we're a small company and we have limited ability to support customers. The second is the manufacturing for the NC devices is still ramping up.

How do you plan to create NC interoperability at the server level among NC product suppliers?

In three steps. First, at the applications level, so that an HTML or Java application on an NCI NC will also run on a Sun JavaStation or an IBM Network Station. Second, through the smart card [a microprocessor device the size of a credit card that holds the user's data and personal configuration information], which if based on the

standard we announced a few weeks ago, will work in any NCI-based NC. Third, being able to run my NCI NC off an IBM server. This level of interoperability is being discussed and worked on right now. I hope by the end of the calendar year to have an architecture and specification to implement that.

What are NCI's goals for the rest of '97?

In the corporate marketplace, to create a stable portfolio of reference account customers that will deploy NCs in meaningful applications. We want 10 or 12 of those this year. In the consumer market, I'm not looking for huge volumes, but rather for validation that the consumer NC market exists.

"I was a little skeptical of the whole idea [of a network computer]. I'm now extremely enthusiastic about it."

Jerry Baker, CEO, Network Computer, Inc.



Oracle Chairman Larry Ellison and Netscape CEO Jim Barksdale last week agreed to merge their network computer subsidiaries.

Oracle nabs Netscape's Navio

Oracle Corp. and Netscape Communications Corp. last week agreed to merge their network computer (NC) subsidiaries to create a more powerful Oracle-owned company aimed at fostering sales of thin-client products.

The new company will bear the name of Oracle's existing Network Computer, Inc. (NCI) subsidiary and incorporate managers and developers from Netscape's Navio Communications, Inc. Both subsidiaries were formed last year, challenging Microsoft Corp. with a computing approach that involves running applications and storing data on networked servers and stripping clients of needless hardware and software.

NCI has been focused on the corporate market with client and server software for connecting NCs to servers and administering desktop and server computers. Navio has focused on the consumer market, reworking Netscape's browser software to link television sets to the Internet.

Under the agreement, NCI President Jerry Baker becomes the company's CEO; Navio President Wei Yen will retain his position in the new company. Oracle will be the majority owner; Netscape will remain a minority owner. Oracle will buy Navio by taking a \$60 million, one-time charge, spread over the current fiscal year. No other details of the transaction were released.

—John Cox

Artificial intelligence may ultimately lead to divorce

A few weeks ago, IBM's Deep Blue chess computer gave Gary Kasparov, undoubtedly the greatest chess player in the world, a drubbing he'll never forget.

Kasparov wasn't too pleased to have been beaten (he got paid only \$400,000 for losing, as opposed to \$700,000 if he'd won). He said several times in an interview with Larry King a few days after the match that he wanted to see the logic behind Deep Blue's game and was rather piqued that the Deep Blue team wouldn't oblige.

For me, one of the most intriguing things was Kasparov's relationship with Deep Blue. When you consider that Deep Blue was designed solely to play chess, it was notable that Kasparov kept referring to the computer in essentially anthropomorphic terms.

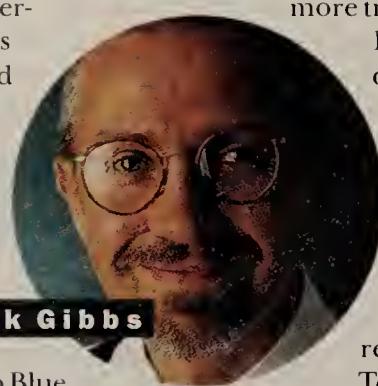
Kasparov spoke as if he had interacted with something that exhibited much more than automatic, preprogrammed or calculated responses. He said that its responses weren't human — it wasn't like playing a person — but Kasparov acted as if it had personality.

And it's our assessment of personality, rather than our judgment of smartness that we respond to. This applies not only to our digital creations, but also to how we respond to our pets.

Kasparov spoke as if he had interacted with something that exhibited much more than automatic, preprogrammed or calculated responses.

<digression> Many critics of artificial intelligence — including those of a metaphysical bent who insist that something like a soul is a prerequisite of intelligence — consider the fact that humans created hardware and software as a prior argument against machine intelligence. In other words, because humans created it, it can't be anything more than a machine. Phooey. </digression>

A few days after the Larry King interview, I was talking with my friend Tony Miranda about machine intelligence and the idea of personality being important. Most people,



Mark Gibbs

for example, seem to think their computers have personalities. We more or less automatically imbue our PCs with some kind of character. And don't tell me you've never sworn at your machine, coaxed it with soft tones or threatened it with violence if it produced the blue screen of death one more time.

I guess you might think of Windows as having the personality of, say, a cockroach or frog.

With the addition of Office 97's Office Assistant — which I wrote about a couple of weeks ago — PC personality might have progressed to the level of a bright rat or a retarded dog.

Today, as I took a break out on the terrace with a Carlos Torano No. 5 at 1 a.m., I got to wondering where it is all heading. I reckon that we'll eventually get machines so behaviorally complex that it won't just be a matter of reading the manual and loading the software.

Applications will be built from so many complex components that they will have to be psychoanalyzed and persuaded into doing what is required.

We may wind up with a new profession — behavioral psychology for software — which will fix your delinquent applications. "Doc, my relationship with Ethel, my word processor, isn't what it used to be. I think she's having an affair with my database."

In the future, when you install software, you'll be doing something a lot like training a dog or even like educating a child. And while you'll be able to define some personality attributes in the early stages of your relationship, as you use the application, its behavior will evolve.

It will pick up your personality traits, and will, in turn, support or modify your behavior.

Mark my words: Some day soon, you'll read about someone who was driven into full-fledged psychosis through a relationship with a database program.

Perhaps we'll need software relationship counseling and eventually information technology groups will gain a whole new responsibility: Doling out tea and sympathy to users that want to divorce their business graphics package.

Go on, I know you've got some strong feelings on this topic, so let it all hang out at nwcolumn@gibbs.com or at (800) 622-1108, Ext. 504.

'NET BUZZ

The latest on the Internet/intranet industry

By Chris Nerney

LET'S GO TO THE LIVE SHERPA-CAM When it comes to publicity stunts, you have to admit Xing Technology Corp. aims high.

The Internet multimedia applications vendor chose the top of Mount Everest in Nepal as an ideal place to showcase its ability to deliver live audio and video streaming over the Internet.

Xing recorded last Thursday's final assault on Everest's peak by a team of Malaysian climbers trying to be the first from the Southeast Asian country to conquer the world's most famous mountain. We think we know a few climbers who will be trying out a brand-new pick-up line in Malaysian nightclubs.

Based in San Luis Obispo, Calif., Xing is best known for its StreamWorks group of products that enables audio and video to be played on a computer as it is being received, without having to download.

Granted, Xing has supplied live 'Net feeds under much more trying conditions — Comdex and Interop come to mind — but multimedia streaming over the Internet from 29,000 feet must be some kind of record.

"ALL RIGHT, WE'RE THE MOST MESSED UP!" Every company has a business problem. And if yours is bad enough, it could win you software and services worth as much as \$1 million.

All you have to do is spill your guts to **OneWave, Inc.**, an Internet software and services company based in Watertown, Mass. OneWave is running an interactive Web-based "card game" that urges players to reveal their biggest business problems by answering a group of questions.

OneWave officials say the company selected as having the most compelling business problem will win software and services to help solve that problem.

The OneWave "Big Deal" runs through June 19 and is accessible on the company's Web site (www.onewave.com) and via **PointCast** online advertising. The "winner" will be announced July 31. We have been assured that **Ed McMahon** is not involved.

VITALSIGNS SIGNS FOR \$5.6 MILLION Only a month after launching its debut product, **VitalSigns Software, Inc.** of Santa Clara, Calif., has wrapped up a \$5.6 million venture capital deal with **Sequoia Capital** and **Austin Ventures**.

VitalSigns was founded last summer by former Bay Networks, Inc. execs **Montgomery Kersten**, who is the company's CEO, and **Jim Goetz**, who is chief operating officer.

In April, VitalSigns released its first product, Net.Medic, a browser companion designed to allow end users to monitor, diagnose and correct Internet performance problems.

Goetz says VitalSigns is working on similar diagnostic software for network managers and chief information officers.

THEY MIGHT BE GIANTS Push middleware vendor **Tibco Software, Inc.** has been hanging with the big boys lately.

Last week, Palo Alto, Calif.-based Tibco announced that networking hardware heavyweight **Cisco Systems, Inc.** has bought a minority share of the company.

Cisco must be losing its appetite; usually it likes to swallow companies in one gulp.

Tibco and Cisco are part of an industry effort to promote push technology standards. They also have agreed to incorporate Tibco's push software into Cisco's Internetworking Operating System.

Also last week, Tibco announced its support for **Microsoft Corp.**'s Channel Definition Format for push broadcasting as well as Internet Explorer 4.0.

Tibco is a subsidiary of London-based news and information company **Reuters Holdings PLC**.

'Net Buzz is starting its own contest. Send us your hottest Internet-and intranet-related news. The winner gets to have a picture taken with us wearing a bee suit. Clarification: We won't be wearing the bee suit, you will. Contact Chris Nerney at cnerney@nw.com or (508) 820-7451.



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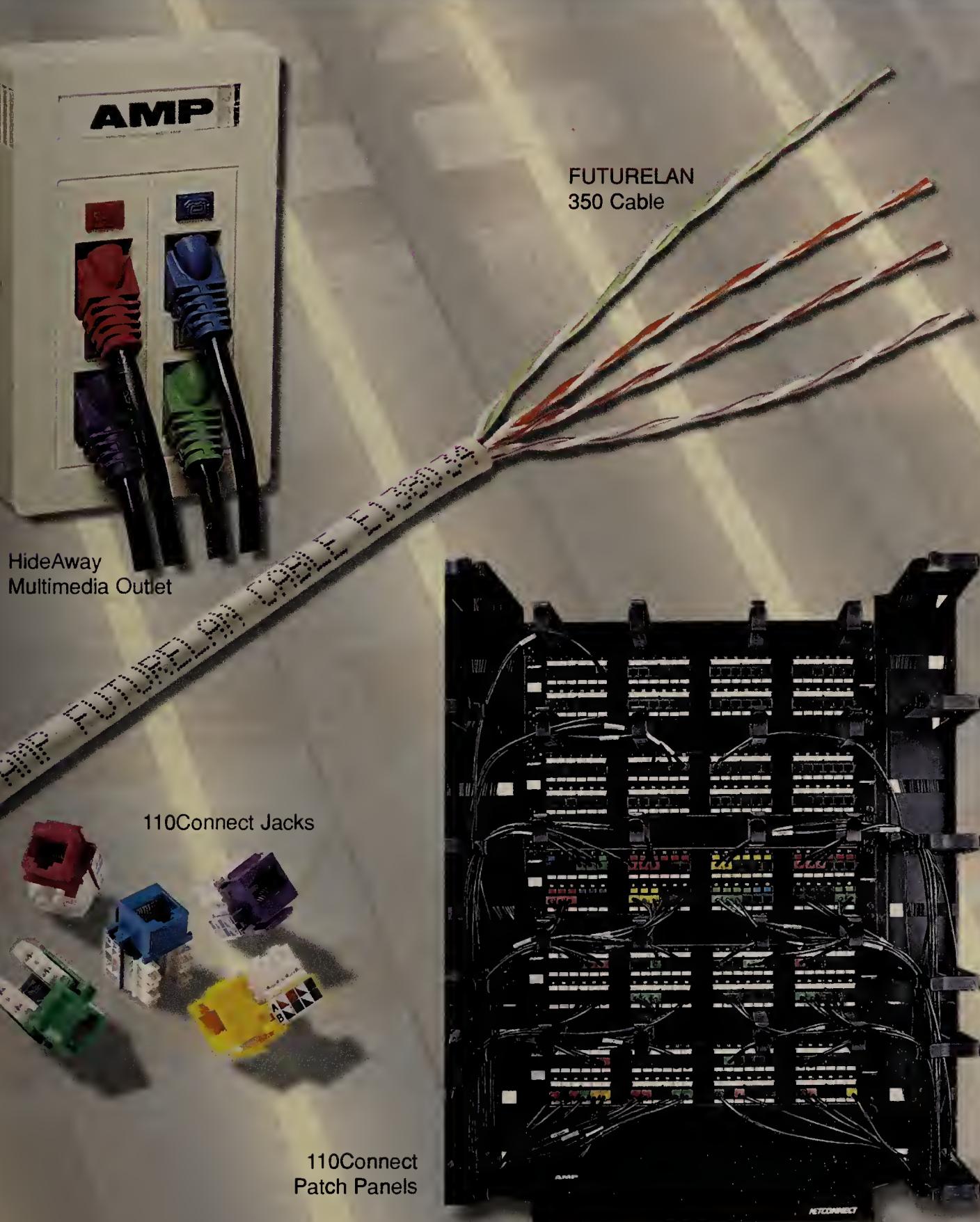
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Connecting
at a
HIGHER
level

AMP

HERE'S THE ANSWER. WHAT'S THE QUESTION?

Since the way you use your network has changed dramatically, now is an excellent time to question its conventional design. Put simply, your rigid system isn't equipped to handle the fluid movement of intranet traffic, Internet access, and new applications that take advantage of both. Enter Adaptive Networking.

cornerstone technologies: Access, Switching, IP Services, and Network Management.

Q: • WHAT ABOUT RELIABILITY?
When your network goes down, so does productivity. Not to worry. Adaptive networks are inherently more

provides the powerful ability to visualize and analyze real-time traffic flow across your entire network. Intelligent agents monitor your network infrastructure, keeping your IT staff informed of changing conditions and often making adjustments as needed. What's more, Optivity includes analytical tools for capacity planning to help reduce budget surprises.

**Q: • WILL IT WORK WITH
• WHAT I'VE ALREADY GOT?**

Of course. It wouldn't be truly adaptive if it didn't. You can adopt this technology at your own pace in cost-justifiable increments. Adaptive Networking even makes our competitors' products smarter and faster. Good news, since you probably already own some.

**Q: • CAN IT GIVE MY BUSINESS
• A COMPETITIVE EDGE?**

Definitely. You can offer hot, new services and build closer links with customers and business partners. Should they need access to your corporate network from the Internet, you can offer secure virtual private network connections. Want to add voice-over-IP capabilities to link customers and service representatives from your Web site and reduce long-distance phone costs? Adaptive networks can do this and much more.

**Q: • WILL IT WORK WITH THE
• LATEST APPLICATIONS?**

Applications drive your network needs. That's why adaptive networks shift on the fly to match routing priorities to your applications. For example, financial transactions and video conferencing can take routing priority over e-mail packets and Web browsing.

ANY QUESTIONS?

If your network can't do all of this, it's time to start asking a few questions of your own. For a free strategy paper, visit www.baynetworks.com/adapt/a6 or call 1-800-8-BAYNET ext. 297. Adaptive Networking is exactly what your business needs. Without question.

Adaptive Networking

Q: ALL RIGHT, WHAT IS IT?
Adaptive Networking is a set of products and cornerstone technologies that transition today's networks to the IP-optimized networks of tomorrow. The aim of Adaptive Networking is to build networks that are invisible to users, worry-free for network managers, and strategic for the business.

Q: WHAT DOES IT OFFER?
Our philosophy is centered around more services with less complexity. How? Through transparent scalable technologies that ensure long-term, non-disruptive network evolution; drive operational productivity at every level of the organization; and adapt to changes in network usage and business requirements.

**Q: • WHAT ARE THOSE
• SCALABLE TECHNOLOGIES?**
Bay Networks products are being developed around industry-leading

reliable and scalable thanks to symmetric multiprocessing and a distributed architecture. In other words, there's no single point of failure to bring down your network. Moreover, the system automatically reroutes traffic as needed to avoid bottlenecks. And you can easily add to, change, and modify your network without disrupting users.

**Q: • HOW CAN I REDUCE NET-
• WORK OWNERSHIP COSTS?**
Adaptive networks automatically find and configure new devices to save your IT staff considerable time. And thanks to our Autosensing Technology, the system determines which users have 10Mbps or 100Mbps capabilities, for example, and matches them with the bandwidth they need.

**Q: • HOW CAN WE AVOID
• SURPRISES?**
With Optivity®, your IT staff can proactively manage all the devices in your network as one cohesive system—even if it extends across the Internet. Optivity also

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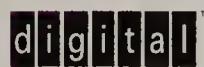


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